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SOME RESULTS OF THE TREATMENT OF TUBERCULOSIS WITH KOCH'S LYMPH, OR TUBERCULIN.

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The discovery of a remedy offering such possibilities in the way of curative action as Koch's tuberculin has naturally led to a widespread trial of its efficacy in all forms of tuberculosis. Considering the nature of the disease in its several varieties, it is obvious that a true estimate of the power of the remedy can be formed only after long and repeated trials. It is only too plainly evident, however, from the tenor of the reports already published, that the remedy has failed to accomplish all that was at first hoped for. On the other hand, it is equally certain that when used with due precautions it may have, in some cases at least, a decidedly beneficial and curative action, the extent and permanency of which time alone can determine. Hence, all cases of treatment with the new remedy, if properly watched and the results recorded, cannot fail to afford data of more or less value in determining its limitations and the conditions under which beneficial results may be looked for.

The following report is a statement of the results obtained in a somewhat long-continued treatment of one case of pulmonary tuberculosis, one case of tubercular laryngitis, and three cases of lupus:

Case of Pulmonary Tuberculosis.—Male, aged twenty-eight years; occupation, electrical engineer. No known hereditary predisposition to consumption. This case first came under the observation of one of us on

November 30, 1889. The appearance of the patient at that time was markedly anæmic, and he was troubled by a frequent dry cough. Pulse, 120; temperature, 102.5° F. Physical examination showed the following signs: Right lung sound; over left lung considerable loss of resonance on percussion; from the upper border of the fourth rib to the sixth rib there was marked dulness extending round under the angle of the scapula; on auscultation the vesicular murmur was found weakened throughout the whole lung and completely absent over the area of dulness previously mentioned. The patient admitted that for some months he had been suffering from pain in the left lung at the point indicated, and that he had had profuse hemorrhages every month since the preceding May. At this time, November 30, 1889, there was no expectoration. There were no moist râles or any other evidence of disease than already stated. On December 4th, the patient had a very profuse hemorrhage, and was compelled to remain in bed. From this date there was a gradual improvement, the temperature and pulse became normal, and on February 12, 1890, the patient was able to go to Florida. Up to this date there was practically no expectoration and consequently no microscopic examinations were made for bacilli. The patient remained in Florida and the Southern resorts until June, during which period he gained in weight and strength and "felt able and ready to resume work." On his way North, after very severe exercise, he was attacked by a violent hemorrhage, and this was quickly followed by another of still greater severity at Asheville, N. C. After he had regained sufficient strength he was examined by Dr. J. H. Williams, of Asheville, who wrote the following report, June 11, 1890:

"Examination of Mr. — shows exaggerated bronchial respiration on right side, which is compensatory. Percussion note good throughout. On left side there is supra-clavicular dulness, decreasing as you pass downward to fourth intercostal space, where the note is amphoric, which again fades away till the lower border of upper lobe is reached, where it is dull. Coarse râles in upper part and crepitant râles in lower. On posterior surface, left side, amphoric note clearly marked just below spine of scapula. Indication of cavity in lower part of upper lobe near the posterior surface."

The patient returned to New Haven in the middle of June, and has been under close observation ever since. On August 4th there was another serious hemorrhagic attack, and again during the first week in October. The loss of blood during this latter attack was quite remarkable. There were hemorrhages every three hours, night and day, from October 4th to October 10th, in which from one to three ounces of bright blood were expectorated each time. The progress of the disease in the left lung went steadily on up to December 3d. For some months there had been regular purulent expectorations. The cavity had increased in size and moist râles could be heard all through the portion of the lung remaining. The patient was extremely weak and anæmic, the loss of blood in October having left him bedridden. The digestive powers were so impaired that only milk and liquid foods could be used. The general depression was greatly out of proportion to the extent of the disease.

This somewhat lengthy history of the case up to December 3d shows a gradual progress of the disease in the left lung from initial consolidation up to the formation of a large cavity, with a possible distribution of the disease throughout the greater part, if not the whole, of this

lung. On the other hand, the right lung was perfectly sound, and possibly some portion of the left lung may have been in fair order. The weakness, however, was extreme, and this, together with the enfeebled digestive powers, rendered the moving of the patient to a more favorable climate impossible.

At the urgent request of the relatives of the patient, treatment with Koch's lymph was decided upon, with a clear understanding of the fact that the case did not belong to the class of incipient cases in which complete recovery could be looked for with certainty, but as one where at least some benefit might be expected, assuming the lymph to have the virtues ascribed to it.

The first injection was made on December 3d.[1] At this time the coughing was severe; the expectoration, however, was slight, not exceeding in quantity one ounce during the twenty-four hours, and the sputum contained only a few tubercle bacilli. A short time prior to the injection the pulse was 72, respiration 16, and temperature 98.8°. At 4.20 P.M. 0.5 milligramme of lymph was injected, temperature, pulse, etc., being recorded every hour. Four hours after the injection, the patient complained of a peculiar burning sensation at the seat of the disease in the left lung. This was followed two hours after by stiffness, soreness of the joints and a slight rise in temperature, 99.6°.

On the following day the injection was omitted, the only thing noted being a continued soreness in all the joints.

December 5. A second injection of 0.5 milligramme of lymph. This, like the first, was followed by a slight rise in temperature four hours after the injection, and the same sensation in the chest and soreness of the joints, together with a general feeling of chilliness.

6*th*. Injection of 0.5 milligramme without noticeable change in temperature, pulse, or respiration.

7*th*. Injection of 1 milligramme. Eight hours after injection, slight rise in temperature (1°), stiffness of the joints, severe attacks of coughing, with labored breathing.

8*th*. Injection of 1 milligramme. No noticeable reaction aside from increased coughing and the general feeling of malaise and soreness of the joints, which was very marked after these initial injections. There was almost no expectoration during the last three days.

9*th*. No injection, on account of the general depression and lassitude of the patient.

10*th*. Injection of 1 milligramme. Slight rise in temperature, pain over the left lung, same soreness of joints, shortness of breath.

11*th*. Injection of 1 milligramme. No reaction; a very quiet and restful day. Patient ate a little steak for the first time without disturbance of digestion.

12*th*. Injection of 2 milligrammes. At the time of injection the pulse was 86; temperature, 98.6°; respiration, 19. Ten hours after, pulse was 92; temperature, 100°; respiration, 23, with labored breathing.

13*th*. No injection; severe coughing during day and night. General malaise very pronounced.

[1] For this early receipt of the lymph the writer is indebted to the kindness of his friend, Professor Kühne, of Heidelberg. Later samples were received directly from Dr. Libbertz, R. H. C.

14*th*. Injection of 2 milligrammes. This was followed by a comparatively strong reaction with considerable disturbance, as indicated by the following table:

	Time.		Pulse.	Temp.	Resp.	
14*th*.	11	A.M.	84	98.9°	19	
	11.15	"	Injection of 2 mg.			
	12	M.	82	98.5	19	
	1	P.M.	91	99.1	25	
	4	"	70	98 2	23	
	8	"	95	101.1	16	Extremities cold;
	11	"	114	101.1	22	[vomiting.
15*th*.	8	A.M.	95	100.0	26	
	10	"	97	99.8	23	
	12	M.	88	99.8	20	
	4	P.M.	80	98.6	19	

16*th*. No injection; patient depressed; profuse sweating and general malaise.

17*th and* 18*th*. No injection; increased appetite; restful sleep. Expectoration very slight, mostly mucus with only a few tubercle bacilli.

19*th*. Injection of 1 milligramme. No reaction.

20*th*. No injection.

21*st*. Injection of 2 milligrammes. This was followed by much the same reaction as on the 14th, without, however, the nausea and vomiting.

	Time.		Pulse.	Temp.	Resp.
21*st*.	10.30	A.M.	84	98.2°	16
	11	"	Injection.		
	1	P.M.	85	98.8	14
	2	"	83	99.6	16
	4	"	80	98.6	14
	5	"	103	99.0	16
	6	"	96	100.0	23
	8	"	104	101.0	20
	10	"	102	100.0	20
22*d*.	8	A.M.	83	98.6	16

23*d*. Injection of 2 milligrammes. This gave rise to a reaction similar to the preceding, but less severe, the temperature rising only to 100°.

24*th to* 26*th*. No injection. Up to this date there was certainly in many ways decided evidence of gain in the condition of the patient. The appetite had improved, likewise the digestive powers, so that solid food could be taken with comfort. Furthermore, after the depressing effects of the injection had worn away, the strength of the patient appeared to be increased; in other words, the remedy, even in the small quantities employed, appears to have had a general stimulating effect. In a general way, the expectoration seems to have been somewhat increased by the action of the remedy, although at no time excessive. On one or two days the increased expectoration was accompanied by a change in the character of the sputum, more pus conglomerations appearing, together with more mucus. The number of bacilli, however, remained essentially the same; in fact, this case has been characterized throughout by the small number of bacilli, both tubercular and other varieties, in the sputum.

27*th.* A slight hemorrhage, the first since October 8th, with attendant weakness and depression.

28*th to* 31*st.* No further hemorrhage. On the 30th, an attack of labored breathing, relieved by strophanthus; no coughing or expectoration; pulse and temperature normal.

January 1, 1891. An egg for breakfast, the first solid food taken at breakfast for two months. Patient sleeps well, feels stronger, and is able to be dressed and up for several hours during the day.

2*d to* 9*th.* Injection of 1 milligramme of lymph each day. More or less of reaction following each injection, the temperature, however, never rising above 100°. On one day, accompanying the maximum temperature there was a slight chill with profuse perspiration. As in the preceding injections, even these small quantities of lymph produced a general reaction out of all proportion to the slight rise of temperature; soreness and stiffness of the joints, malaise, and a general feeling of discomfort being the prominent features. Although the fever reaction was slight, we deemed it injudicious to increase the amount of lymph while the general reaction was so pronounced. At the end of these eight successive injections, the weariness of the patient was so marked that the injections were discontinued until February 30th. During this period the temperature remained perfectly normal throughout, but the general weakness was so pronounced that it seemed unwise to add to it the fatigue incidental to the reaction of the lymph. During the last ten days of the resting period, the patient became stronger and felt decidedly better.

February 4. Injection of 2 milligrammes. No reaction.

5*th.* Injection of 2 milligrammes. Pronounced reaction; temperature rising to 100.2°, pulse 105, with stiffness of the joints.

6*th and* 7*th.* Injection of 3 milligrammes each day. On the 6th, the reaction was pronounced, the temperature rising to 100.3°, pulse 108. Considerable pain was felt in the left lung; considerable coughing; slight increase in expectoration; one or two periods of shortness of breath. On the 7th, the reaction was less pronounced.

8*th and* 9*th.* Injection of 4 milligrammes each day. No rise of temperature on either day. Malaise less pronounced than with previous injections. Good appetite, patient eating a hearty dinner without distress. The only noticeable feature was a profuse perspiration at several periods during the two days.

10*th and* 11*th.* Injection of 5 milligrammes each day. On the 10th, there was a rise of temperature to 100.2°. On the 11th, no rise in temperature. Sweating less profuse. Considerable coughing, but expectoration not over 10 cubic centimetres per day. Sputum, however, thick and purulent.

12*th to* 13*th.* Injection of 7.5 milligrammes each day. On the 12th, rise of temperature to 100.3°. No rise of temperature on the 13th. Almost no sweating; considerable dry coughing; no increased expectoration. Two very comfortable days, free from all malaise or pain in joints, etc.

14*th.* Injection of 10 milligrammes. No reaction.

Injections of lymph were then suspended until March 10th.

We were led to this by the fact that the evening temperature showed a tendency to rise to 100°, something unusual in this case, except under the influence of the lymph, and as the expectoration had diminished,

and at the same time had become more purulent, it seemed probable that in some portion of the left lung there was going on a partial breaking down of necrotic tissue, which, if unduly excited by further injections of lymph, might, from the inability of the patient to remove the necrotic matter, lead to an uncontrollable septic fever.

This temporary discontinuance in the use of the lymph was finally followed by the gradual lowering of the evening temperatures, until at last the temperature remained approximately normal during the entire twenty-four hours.

On March 10th and 11th, injections of 2 and 4 milligrammes respectively were made, without reaction.

13*th*. Injection of 6 milligrammes. Reaction very marked, temperature gradually rising, until eight hours after the injection it reached 104°, where it remained for two hours or more. No other unusual indications.

14*th*. Temperature normal, but patient still uncomfortable and languid from the reaction of the preceding day.

15*th*. Temperature and pulse normal. Restless night, great difficulty in breathing, and constant faintness, requiring stimulants and open windows to revive him. At mid-day, the patient had a fairly free hemorrhage of dark and more or less clotted blood, quite different in nature from his previous hemorrhages. In fact, the peculiar appearance of the material discharged, together with its marked putrid odor, was strongly suggestive of the hemorrhage having been caused by the breaking away of semi-necrotic tissue. It seems quite probable that this hemorrhage was at least indirectly connected with the very pronounced reaction induced by the injection of the 6 milligrammes of lymph on the 13th, and the effect on the patient was beneficial rather than harmful. At first, there was naturally considerable weakness, but the patient rallied after this hemorrhage as never before after a hemorrhage of like extent. Indeed, the removal from the lungs of such putrid matter as accompanied the blood discharged could not be other than ultimately helpful.

16*th*. Expectoration of a moderate amount of blood, of the same character as on the 15th, at intervals during the day. Pulse, full and of fair strength, 80.

17*th*. Temperature 99°; pulse 81; respiration 20. No bleeding.

18*th to* 21*st*. Patient quite comfortable with good pulse and normal temperature; apparently far less prostration than after an ordinary hemorrhage.

22*d*. There was another slight hemorrhage, followed on the 27th by several more profuse ones.

23*d to April* 5*th*. No injections. The patient gradually gaining strength and recovering the lost ground.

On April 6th, injections were again commenced, beginning with 1 milligramme and continued with gradually increasing doses up to the date of writing, without any pronounced reaction being obtained until 6 milligrammes of lymph were given, when the temperature rose to 102°.

In this case the treatment, so far as it has progressed, has not resulted in any radical improvement in the condition of the patient's lung. There has been a ready response to the remedy, and the reactions produced have agreed essentially with the descriptions given by Dr. Koch.

As already stated, however, the general reaction produced by the tuberculin has been, in most instances, out of all proportion to the rise of temperature; in other words, general malaise, pain in the joints, etc., have been more pronounced with the small quantities of the remedy employed than the rise of temperature.

In one respect the reagent has produced a very marked effect. It has certainly had a decidedly stimulating action, this being manifest not during the period of injections, but in the after-periods, or periods of rest. It is to be remembered that the treatment was commenced at a time when the patient's strength appeared nearly gone; there was a lack of appetite and weakened digestion. After the use of the lymph, however, this condition was greatly improved; the appetite was stimulated, the patient's digestion responded to the increased tax upon it, until, finally, even more than the full complement of nutritive food was taken and assimilated each day. Coincident with this gain, the patient's strength was increased, and he was able to move about his apartments with greater ease than for some time past. The patient himself fully recognized the stimulating action of the remedy, and when the injections were discontinued for lengthy periods frequently remarked that he felt the need of more lymph.

On the other hand, the course of the disease in the lung has not apparently been materially modified by the use of the lymph.

During the later injections, the general or constitutional reaction produced has been less pronounced—that is, no marked soreness of the joints, malaise, or feeling of lassitude.

Further, in the later injections the sputum has tended to diminish in quantity, and at the same time to grow thicker and more mucopurulent.

Case of Tubercular Laryngitis.—Male, aged twenty-seven years. Body weight 136 pounds. Family history shows several cases of laryngitis. This patient was kindly submitted for treatment by Dr. Henry L. Swain, of New Haven, who has given us the early history of the case, as far as it came under his observation. Patient had been out of health for a period of five years, during which time he had had more or less continuous cough. For a year back he had been hoarse continuously, sometimes able to talk only in whispers. He had had several hemorrhages, the last occurring in May, 1889. In February, 1890, soreness was felt in swallowing on the left side. His throat was first examined by Dr. Swain on the 2d of June, 1890, at which time the condition of both throat and lungs was essentially the same as on December 4, 1890. On the latter date, lesions in the throat were as follows: Swelling of the epiglottis and redness confined to the left edge and the ary-epiglottic fold. The mucous membrane covering the left arytenoid and false vocal cord was swollen very considerably, and the upper surface of the arytenoid, as also a portion of the ary-epiglottic fold, presented decided erosions of the epithelium, but no very marked ulceration. On the false vocal cord

there was an ulceration decidedly gray and unhealthy in appearance, and the cord itself was so swollen as to entirely conceal the true vocal cord of that side. The right vocal cord was visible and apparently free from ulceration. The arytenoid of the left side was half again as thick antero-posteriorly as the right, the latter being one-half thicker than what might be considered normal for this case. The patient could swallow only on the right side.

The condition of the patient's lungs at this date was as follows: Consolidation of the right lung down to the third rib in front and half way between the spine of the scapula and lower angle behind. Over this entire region, large and small moist râles were very abundant. A few moist râles could be heard through the entire lung. On the left side, in the mammary region, was a spot slightly tympanitic. At the same level behind, the breathing appeared slightly bronchial. Infrequent râles were scattered through the entire lung.

From this it is plainly evident that the case was one of exaggerated laryngeal tuberculosis, complicated, as is usually found, with a seriously diseased condition of the lungs. Treatment with Koch's lymph was decided upon at the urgent request of the patient and his family, in the hope that some relief might be afforded the exceedingly dangerous laryngitis.

Prior to the injection of lymph, and for some time thereafter, the expectoration was quite abundant, the sputum being more or less watery, with lumps of mucus and pus. It was found exceedingly rich in the ordinary forms of mouth bacteria, and contained in addition a fairly large number of tubercle bacilli.

The patient was fairly strong, with good digestion and a fair appetite.

The first injection of lymph was made on December 4th. Temperature, pulse, and respiration were noted every hour, and the larynx was examined, as a rule, each day. All of the laryngeal examinations were made by Dr. Swain, to whom we are greatly indebted for his careful observation of the changes occurring in the larynx during the progress of the case. At the first injection, 1 milligramme of lymph was used. The temperature rose from 99.4° to 101° in three hours, and remained above 100° for two hours, after which it went down to 99.2°. There was a slight chilliness of the extremities at the time of fever, and an unusual feeling of dryness in the naso-pharynx and larynx.

5th. Injection of 1 milligramme. No noticeable rise in temperature. Several severe attacks of coughing with increased expectoration. Examination of the larynx showed a slight additional swelling in most of the infiltrated tissue of the already thickened parts, especially noticeable on the arytenoids and on the edge of the epiglottis.

6th. Injection of 2 milligrammes. Temperature did not rise above 99.9°. Hands and feet were chilly at times, and covered with cold perspiration. The left arytenoid appeared less swollen than on the previous day, and the ulcer upon the left false vocal cord had commenced to assume a slightly cleaner appearance. It is to be observed that on these first days of treatment hourly observations of temperature, continued up to midnight, and sometimes beyond that hour, failed to show any rise of temperature beyond 99.9°, except on the days when the lymph was injected.

7th. Injection of 3 milligrammes. Eight hours after the injection

the temperature rose to 100.8°, accompanied by a chill which lasted for half an hour, followed by profuse sweating. A slight trace of blood was observed, tingeing the lumps of mucus in the sputum. There was a severe fit of coughing, with gagging, which finally terminated in vomiting. Throat felt constricted and sorer than usual.

8th. Injection of 3 milligrammes. Six hours after injection, the temperature rose to 101.2°, without the accompanying chill. Coughing was quite severe through the day.

9th. No injection was given on this day, as the temperature remained above 100°. Patient furthermore complained of soreness in the joints and of some pain in the right lung. There was also more or less depression. Examination of the larynx showed less swelling of the arytenoids and a cleaner appearance of the ulcers.

10th. Injection of 3 milligrammes. Maximum temperature 102.1° ten hours after the injection, accompanied by more or less oppression in breathing. Patient reports greater ease in swallowing than for a long time previously. Vomited once during the day; pain in the left side; stiffness of the phalangeal articulates; urine dark-colored, very thick, and of high specific gravity. Slept quietly all night without any spells of coughing.

11th. Injection of 3 milligrammes. Rise of temperature from 99.5° to 102.8°, ten hours after the injection. Soreness in all the joints; severe headache; face flushed; feeling of constriction in the lungs; extremities cold; back covered at times with perspiration; peculiar rattling in the left side of the chest near the nipple. This latter phenomenon continued with greater or less intensity for several hours. When first noticed it was not very marked, but rapidly increased so as to be very evident and alarming to the patient himself, and could be heard distinctly by any one standing near him. This peculiar rattling or gurgling sound was synchronous with the impulse of the heart, continuing when the breath was held, but was heard only when the patient was lying on his left side. It was probably due to an accumulation of liquid in one or more of the cavities of the left lung, the splashing being naturally produced through the agitation of the cavity by the cardiac movements. The heart-sounds were entirely normal and distinct through it all. No intermittence. Coincident with this apparent exudation, the urine was much diminished in volume. The twenty-four hours' quantity amounted to only 320 c.c, with a specific gravity of 1025.5. It was entirely free from albumin, sugar, etc., and contained 14.2 grammes of urea and 0.63 gramme of phosphoric acid (P_2O_5). This condition was relieved by treatment. On this date the larynx showed considerable improvement. Owing to the diminished swelling of the left ary-epiglottidean ligament, the epiglottis was more erect than formerly. The ulcers in the interior of the larynx were quite free from gray necrotic tissue, and showed some little color. The left vocal cord, which, up to this time, had not been visible, could now be distinctly seen, ulcerated on its free border. The left edge of the epiglottis was distinctly thinner.

12th. Temperature during the day oscillated between 100.1° and 102.4°. No injection was given. The urine was increased in volume to the normal quantity, and the patient appeared much more comfortable. No disturbance in the chest. Examination of the larynx showed the right vocal cord of paler color, and the ulcer on the right false vocal cord very superficial.

13*th*. Early morning temperature (7 A. M.) 98.8°. During the remainder of the day, the temperature varied between 100° and 102°, with a tendency to rise in the afternoon. Pain still persisted in the joints, together with periods of chilliness during the day. There was likewise a feeling of constriction in the upper part of the chest with severe coughing spells and increased raising of thick masses, in which no great increase of tubercle bacilli could be detected. There was likewise some vomiting, presumably caused by the use of digitalis, which had been prescribed a few days previous. A very clear view of the larynx was obtained, showing the ulcer on the left side of the epiglottis very red, but not as deeply colored as formerly. One portion of its edge presented a translucent appearance, as if either œdematous or covered with a thin layer of false membrane. Right vocal cord was visible its entire length. False vocal cord not swollen. Left vocal cord very plainly visible, with the ulceration less extensive, and the false vocal cord of the same side less swollen.

14*th*. Injection resumed, with 1 milligramme of lymph, although the body temperature was higher than normal. The only thing peculiar noted during the day was more or less "tickling" and pain in the throat, most marked eight hours after the injection, with temperature 102.2°, and long attacks of coughing and raising. Patient could not lie down comfortably owing to the condition of the throat.

15*th*. Early morning temperature 98.8°. Patient feeling quite weak. Highest temperature recorded, 101.2° at 9 P.M. No injection given. Observation of the larynx showed on the inner surface of the epiglottis, left side, a mass of tissue at the median border of the old ulcer, which appeared about to detach itself. Otherwise, the larynx appeared the same as on the previous examination.

16*th*. Morning temperature 98.5°. Injection of 2 milligrammes at 10 A.M. Highest temperature 101.2° at 8 P.M. Some sweating during the day, with a hard coughing spell of nearly an hour's duration, six hours after the injection

17*th and* 18*th*. Morning temperature 98.7°. Highest evening temperature 101.6°. No injections. It is to be observed now, in distinction from what was stated under December 6, that even when no lymph is injected there is a decided tendency towards an evening rise of temperature.

19*th*. Injection of 2 milligrammes. Maximum temperature 102.3° nine hours after injection. Great difficulty in swallowing.

20*th*. Patient could scarcely swallow anything save a glass of milk. Solids only go down in very small quantities after repeated attempts; liquids pass down more readily, but are apt to be regurgitated. Swallowing, within the last few days, has been gradually growing more difficult, and the last injection of lymph appears to have produced an increased swelling, especially on the left side, with considerable pain. Examination of the larynx showed marked swelling of the arytenoid posteriorly, with redness of the ligamentum ary-epiglottici leading sideways to the palate. Local application was made to relieve pain in swallowing.

Maximum temperature to-day, without injection of lymph, 101.5°.

21*st*. Injection of 2 milligrammes. Maximum rise of temperature 102.6° eight hours after the injection. Swallowing somewhat easier.

22*d*. No injection. Maximum temperature 101.3° at 6 P.M. It is thus plainly evident that at this date the rise in evening temperature is

always greater by one degree or more on those days when lymph is injected than when it is omitted, showing that the small doses of lymph still used continue to produce a slight fever reaction. Examination of the larynx showed the ulcer on the edge of the epiglottis to be granulating nicely, while the swelling of the left arytenoid was somewhat less, and its erosions disappearing.

23d and 24th. Injections of 1 milligramme each day. Maximum temperature 101.8° and 102.2° respectively. Throat still very sore, with great difficulty in swallowing. Sputum more purulent, and showing some increase in the numbers of tubercle bacilli.

The edge of ulcer on the left side of the interior of the epiglottis was found filled with bright-red granulations, and showed a tendency to encroach upon the margins of the epiglottis. Erosions were to be seen upon the palato-epiglottic fold. Vocal cords were clear, except the free edge of the left one. All ulcers in the interior of the larynx appeared clean and granulating. The lump of tissue mentioned a few days ago as on the epiglottis had almost entirely come away.

No more injections of lymph were given in this case. The morning temperature each day now reached 100°, and rose gradually during the day to 102°–103,° in spite of treatment with acetanilid, phenacetin, etc. There was, likewise, more or less vomiting and great weakness. On the 29th, there was considerable pain on the right side of the chest, about the third intercostal space. The moist râles over the lungs had almost entirely disappeared. Respiration was full and easy. By January 2d the patient was able to swallow much more comfortably. The condition of the larynx at this date was as follows: The ulcer on the edge of the epiglottis was less reddened than formerly, and the entire edge of the epiglottis was thinner. The erosions on the palato-epiglottic fold had entirely disappeared. The swelling on the left false vocal band appeared to be growing steadily less. In the centre of the false vocal cord of the right side a new ulceration was to be seen, very red, with ragged edges.

January 3, 1891. The same high range of temperature. Quite a mass of necrotic tissue was thrown off from the throat, irregular in shape, and consisting of thoroughly disorganized tissue, mixed with mucus and slightly tinged with blood. It came from the median border of the left interior ulcer of the epiglottis. The left border of the epiglottis, where it is ulcerating, showed signs of cicatrizing.

4th. The evening temperature reached 103.6°; the sputum was very thick and purulent.

9th. The bacilli in the sputum appeared much more numerous. The bacilli likewise seemed somewhat smaller and thicker at the ends, as if forming spores. Temperature was not quite as high during the last four days. The extreme edge of the epiglottis had healed, but the ulceration appeared to be advancing to the median line. Patient swallowed as easily as before the injections.

12th. At 8 P.M. the body temperature reached 103.9°. The ulcer on the right false vocal cord, which had steadily been growing less, appeared now to be entirely filled up and about to heal.

During the next week the patient's condition remained much the same except that he was steadily growing weaker. Maximum evening temperature ranged frequently between 103°–104°.

18th. Maximum evening temperature 104.2° Some difficulty in swallowing on the right side. The right side of epiglottis and the

ary-epiglottic fold were found slightly thickened, but not reddened. This was the only thing observed that could account for the difficulty. At this date, the patient began to use the left side in swallowing, succeeding very well with fluids, aside from a little smarting—something which he had not been able to do for over a year. In the left fossa sigmoidea there was found a small swelling not previously seen. The ulcer on the left side of the epiglottis was plainly healing, as also that on the left false vocal cord.

19*th*. Maximum evening temperature 105°. On auscultation, at the lower border of the third rib, on the right side, very loud coarse râles were noticed. This was attributed to the breaking down of the tissue at this point. It was likewise observed that the moist râles over the left lung were much more persistent than formerly. In fact, there was every indication of a serious breaking down of both lungs. Coincident with this the sputum became much thicker, being filled with cheesy masses, and accompanied by an enormous increase in the numbers of tubercle bacilli.

20*th to* 22*d*. Same high fever temperatures in spite of treatment. Severe coughing followed by expectoration of very large dark-green masses, so large indeed as to produce gagging. The thick sputum contained an immense number of tubercle bacilli, the general outlines of which were not apparently different from the usual form.

23*d to* 25*th*. Maximum evening temperature 103°–104°. Expectoration had rapidly diminished in quantity. Prior to January 19th, the average amount of sputum for the twenty-four hours varied from half a pint to one pint, now it did not exceed three to four ounces.

26*th*. Fever less severe, the maximum temperature being 102° at 8 P.M. Patient was extremely exhausted and much emaciated. Swallowing, however, in the last few days had grown very much easier. The swelling on the right side of the larynx had entirely disappeared. The left side of the epiglottis was now quite healed and the median border of the ulceration appeared ready to heal. This was likewise true of the ulceration on the left false vocal cord. Further, the swelling of this latter cord had so far disappeared that the true vocal cord could be seen through its entire length. The two vocal cords appeared of about the same color and of the same width, but the free edge of the left was somewhat irregular, although no actual ulceration could be observed. The left vocal cord did not move quite as easily as its fellow. Moreover, the arytenoid of this side was only a trifle larger than the right arytenoid, the latter being almost normal in thickness.

During the next few days the temperature did not rise as high as formerly, but it was plainly evident that the patient's strength was nearly exhausted. The sputum retained its same thick purulent character and was full of tubercle bacilli. The larynx was seen daily, but on account of the weakened condition of the patient only hurried glimpses were obtained, This much, however, is certain, that up to twelve hours before death no swelling or ulceration occurred to alter the good condition of the various parts of the larynx above described.

For some time prior to this date the patient had been able to take a full amount of fluid nourishment, and on the evening before his death (February 2) had taken his normal complement of food. Indeed, two minutes before his death he drank easily, swallowing without difficulty.

His voice was clearer than it had been for some time past and possessed none of the elements due to mucus and ulceration, which had previously been so evident. His death occurred on the morning of February 2d, from the natural progress of the disease in the lungs, and was entirely free from the agony and terrible struggling for breath so characteristic of death from tubercular laryngitis.

We have, then, in this case very decided evidence of the healing and curative action of the remedy on tuberculous tissue in the larynx. It is further evident that this action is a very strong one, for it is to be remembered that the amount of lymph injected in this case at any one time never exceeded three milligrammes, and moreover that the process of healing was a continuous one, up even to the time of death and in spite of the extreme weakness of the patient. Moreover, the general character of the reactions induced by the remedy was, as seen from the foregoing report, essentially the same as described by Dr. Koch in his several communications, and its great power is likewise manifest from the intensity of the reactions induced by the small quantities employed. So far as it is proper to draw conclusions from this single case, the results would seem to suggest the advisability of continuing the use of the remedy in small quantities as long as favorable action can be obtained, and this would apply as well to cases of laryngitis not complicated with pulmonary trouble, from the evident tendency of the diseased portions of the larynx to become œdematous under the influence of the remedy and thus perhaps necessitate a tracheotomy to save the patient's life. This indeed may happen even with small quantities and with the exercise of the greatest care, and will doubtless always constitute one of the great dangers to be apprehended in the use of the remedy in laryngeal tuberculosis. Fortunately, in this case there was at no time any serious œdema; although such as was produced would probably have been increased to a dangerous extent by large doses of the remedy.

Although the patient died from the natural course of the tubercular disease in the lungs, the process was apparently accelerated by the use of the lymph, as was evidenced by the character of the expectoration, the physical signs which clearly indicated rapid breaking down of the lung tissue at the points previously noted as the most active seat of the disease, and the continuous high temperature which had not existed previous to the lymph treatment.

We are greatly indebted to Drs. T. G. Lee, L. S. De Forrest, C. A. Tuttle, and G. W. Lawrence for their continued assistance in watching the above case.

Case of Lupus.—A., male, aged sixty years, in good general health. This case, kindly submitted for treatment by Dr. Francis Bacon, was an ordinary case of lupus vulgaris of eight years' standing. The lupus was confined to a small area on the left side of the face closely adjacent to the eye, and extending a short distance upward on to the temple.

The active portions at the time the treatment was commenced consisted of an irregular shaped ulcer in the locality indicated, about one inch in its longer diameter, while close to it, directly under the eyebrow, was a hard nodule as large as a good-sized pea. The eyelid was somewhat involved and there was a scarred appearance to the surrounding tissue extending into the hair, showing where the sore had been successfully combatted. During the first five years the patient was not under treatment, as the process of ulceration was not rapid. During the last three years the usual forms of treatment had been followed very thoroughly with only temporary relief. When apparently under control, it had broken out afresh each time either in the same or in a closely adjacent locality, until at the time the treatment with lymph was commenced it occupied the area above indicated.

The first injection of lymph was made on December 4th, the amount injected being 5 milligrammes. The patient was closely watched, the temperature, pulse, and respiration being taken every hour during the twenty-four hours following the injection and at varying intervals thereafter. No reaction followed this first injection. The temperature remained constant at 98°–98.5°, and there were no perceptible changes in the appearance of the lupous swelling or surface, either on the day or night of the injection, or on the following day.

On December 6th, 10 milligrammes of lymph were injected. The temperature did not rise above 99.3°, and there were no noticeable changes in the appearance of the sore, either on this or the following day. The only thing noted was a darting pain around the edges of the sore, felt several times during the day, which the patient stated he had never noticed before.

The next injection, of 15 milligrammes, was made on December 12th. This gave rise to a decided reaction as indicated in the following table:

Time.		Temp.	Pulse.	Resp.	
3.15	P.M.	98.8°	86	20	
	Injection.				
4.00	"	98.8	84	28	
5.00	"	98.3	72	18	
6.00	"	98.9	72	18	
7.00	"	98.9	88	18	
8.00	"	98.6	80	18	
9.00	"	99.0	78	18	Pain over left eye.
10.00	"	99.6	76	18	Slight chill, headache.
11.00	"	100.6	86	20	Edge of ulcer swollen.
11.30	"	100.4	86	20	Decided chill.
12.30	A.M.	100.3	88	20	Surface of old scars red.
2.30	"	101.0	98	22	
4.30	"	100.6	86	20	
7.45	"	99.0	84	18	
8.45	"	99.2	84	18	
10.35	"	98.3	76	17	

Some evidence of this reaction remained until the evening of the 14th, in the form of a redness noticeable here and there on the affected surface.

19*th*. Another injection of 15 milligrammes was given, without any fever reaction whatever. Six hours after the injection the edges of the ulcer became slightly reddened and swollen, the scab appearing puffed out. This condition persisted for some hours, then disappeared.

The injections were repeated on an average of once a week up to the date of visiting, with gradually increasing amounts of lymph, the last dose consisting of 100 milligrammes. With this last dose there was a slight reaction, the temperature rising to 100.6°, and a more or less pronounced reddening of the entire face. Aside from the reaction of December 12, and the one just noted, no rise of temperature whatever followed these injections. Neither was there any very pronounced local change on or about the surface of the sore, such as has been described by Dr. Koch, or such as we have witnessed in a case of lupus to be described later. There was, however, after some injections, as in the two cases mentioned, a slight reddening of the lupous surface, accompanied it may be by a slight swelling. Other minor symptoms indicative of some action on the part of the lymph were noted from time to time, such as an irritation and inflammation of the eye adjoining the ulcer, with considerable conjunctivitis. Further, removal of the scab from the ulcer several times revealed indications of healthy granulation, but at this writing it is difficult to see any marked improvement either in the condition of the sore or of the nodule above the eye. There has been all though the treatment just enough of a suggestion of improvement to warrant the hope of some ultimate gain, in spite of the utter lack of any very marked constitutional reaction. During the treatment, the general health of the patient has been better than usual, so that, at all events, no apparent ill effects have resulted from the continued use of the lymph.

We have been greatly assisted by Drs. W. G. Daggett and J. H. Townsend in our observations of the above case.

Case of Lupus.—B., male, aged fifty years, in good general health. The lupus was confined to a spot on the side of the face extending from the left ear about two inches forward. It was of seven years' standing, and had never been very active. At the time of treatment it had a hard, elevated border, with smaller ulcerating spots scabbed over. Most of the surface was well cicatrized, but red and inflamed in appearance. The size of the whole sore was about two inches in diameter each way.

The first injection was made on February 1st with 5 milligrammes of lymph. This was not followed by any reaction whatever.

Injections were continued at the rate of one a week with gradually increasing doses of lymph up to March 8th, on which date 40 milligrammes of lymph were injected. On the 15th of March, a second injection of 40 milligrammes was made, after which the treatment was discontinued. None of these injections were followed by any elevation of temperature, or any other constitutional reaction. Further, there was during the treatment no change in the appearance of the lupous spot, except in one instance, in which the changes noted occurred two days after the injection. Thus, on February 22d, 20 milligrammes of lymph were injected without reaction. On the 24th the whole diseased surface assumed a deep-red color, felt "puffy," was decidedly swollen, and painful to the touch. This continued for forty-eight hours. At the same time a red papule appeared at the end of the nose, brilliantly colored and prominently elevated. During this period there was no change in temperature or other constitutional reaction.

The treatment was discontinued, as it was plainly evident that the

lymph, owing possibly to the quiescent state of the lupus, was yielding essentially negative results.

We are greatly indebted to Drs. Jackson and C. J. Foote for their assistance in watching the above case.

Case of Lupus.—C., female, aged thirty-three years. This was a case of very active lupus vulgaris of six years' standing. During this time it had been constantly under treatment. The original ulcer was situated on the right cheek near the nose, but was finally healed by the use of caustics. At the time the treatment with lymph was commenced the condition of the diseased parts was as follows: There was an ulcer just beginning on the right side of the nose; a second ulcer extended from the right nostril on to the lip; there was likewise an ulcer on the septum in the left nostril of the size of a five cent piece; the skin of the nose was generally reddened and apparently diseased; the outer wall of both nostrils was partially destroyed by previous ulcerations.

The first injection was made on February 6th, at 11 A.M., with 10 milligrammes of lymph. Temperature 99.5°, pulse 94. At 3 P.M. the patient complained of a palpitation all over the body; the nose appeared much swollen, very hard, of a deep-red color, and very hot; the eyes were watery and the old scar much congested; a reddish papule likewise appeared on the cheek about four inches from the nose. At 5.30 P.M. the patient had a very pronounced chill; the nasal passages were greatly swollen, rendering breathing laborious; small red spots appeared on the left cheek, fifteen or twenty in number; there was pain in all the joints and the general malaise was extreme. At 7 P.M. the temperature was 103°; at 9 P.M. 101.5°, with a pulse of 104; at 10 P.M. the temperature was 102°, with a pulse of 106; all of the symptoms previously noted were greatly increased, while the nose was fully three times as large as before the injection.

7th. At 10.30 A.M. the temperature was 100.6°, the nose still swollen and the old scars deeply congested; there were likewise small spots of congestion over both cheeks; the throat was somewhat sore, while the pain in the joints still continued. The temperature oscillated during the day between 100° and 101°.

8th. Temperature 99° to 99.5°. There was a general feeling of improvement; the pain in the joints was less, the nose less swollen, the cheeks no longer congested, and crusts had begun to form over the ulcerated spots. The general redness of the parts was less pronounced, and there was an apparent scaling on the lips and nose where no ulcers existed.

9th and 10th. Still evidence of the reaction. The temperature had fallen to normal, but the nose was still swollen; the crusts were decidedly thicker, especially on the upper lip. Portions of the skin of the nose and lip appeared white and waxy, while other portions had a deep-red and even purple color.

11th. The scabs on the outside of the nose and lip had fallen off, leaving good, clean surfaces. The scabs on the inside of the nose were still prominent, obstructing the breathing. The redness and swelling of the parts were considerably reduced, but there was a constant and more or less intense pain in the nose, referred by the patient to the outer walls of each nostril. The skin over the greater portion of the nose had a scaly appearance. The old scars had resumed their usual appearance, and the spots on the cheek had entirely disappeared.

12*th and* 13*th*. Feeling of malaise nearly gone, although there were occasional pains in the back. Pain in the nose was less severe, the evidences of inflammation were disappearing, and the nose was assuming its usual appearance. Breathing through the nostrils was freer, although the passages were still obstructed somewhat by scabs.

15*th*. All signs of the reaction having disappeared, a second injection of 10 milligrammes of lymph was given at 11 A.M., with the temperature prior to the injection 98.2°. At 3 P.M. the patient was attacked by a severe coughing spell which continued intermittently for several hours. This was followed by a chill, and at the same time there appeared a white line entirely surrounding the diseased spots and the old scar on the cheek. At 5 P.M. the temperature had risen to 102.8° and the pulse to 108. The temperature remained at 102° to 103°, and the pulse at 110 to 118, until after 9 P.M., when both began to fall. The nose became swollen to two or three times its natural size, taking on at the same time a dusky red or even purplish color; the scar on the cheek was likewise much reddened. No spots made their appearance on the cheek as in the first reaction, but the general symptoms were fully as severe as on the preceding week.

16*th*. The reaction still continued quite severe, the whole diseased area being greatly swollen and congested. The temperature at 8 P.M. was 101.8°. The coughing had stopped, but the throat was very dry. There was a decided exudation and crusting over of the spots similarly affected last week, but the crusts were not as thick.

17*th and* 18*th*. Temperature normal. On the 17th the swelling was rapidly disappearing, and the patient appeared comfortable except on sitting up or moving, when the coughing was incessant and exhausting. There was considerable palpitation of the heart. The pulse was full and of fairly good tone. On the 18th there was less cough and the patient was able to sit up with comfort, although feeling quite weak. The appetite, which had failed after the injection, was returning. The throat appeared very sore; the entire pharynx was reddened, and on the base of the tongue was a white spot, and also on the soft palate, the latter spot being as large as a quarter of a dollar. These were apparently exudations similar to what had appeared on the skin.

19*th*. The general symptoms were all better; the throat, however, remained the same, and the weakness was so pronounced that a tonic was prescribed.

20*th*. The throat was nearly clear and the patient appeared much better. The nose has returned to its normal size and the crusts on the skin had fallen off; the ulceration spots within the nose, however, were still crusted over.

In view of the intensity of the reactions following these two injections, the patient was given a rest of two weeks.

March 6. A third injection was given, this time with only 5 milligrammes of lymph. There resulted, however, a reaction of the same order as the preceding, only of less severity and without the cough and sore-throat. The throat showed no signs of inflammation or white spots. The maximum temperature was 102.6° ten hours after the injection. The temperature remained slightly above 100° during the whole of the following day. There was great pain all over the body, which persisted for some time, and the surface was painful on pressure. There was the same swelling and congestion of the diseased parts as previously noticed,

which, however, subsided more rapidly than with the preceding injections.

11*th*. 10 milligrammes of lymph were injected at 9.30 A.M. At 3 P.M. the temperature was 101.4°, the nose swollen and the diseased surfaces reddened. At 7 P.M. the temperature was 103.4°, at which point it remained until after 10 P.M. The general symptoms were less marked than on any preceding injection. The patient was able to sleep at night and there was an entire absence of cough, sore-throat, etc. On the following day the temperature was normal, while the congestion and swelling of the diseased surfaces were rapidly subsiding, thus showing a more rapid passing off of the reaction than on any preceding occasion.

29*th*. 10 milligrammes of lymph injected. Maximum rise of temperature, nine hours after the injection, 103.6°. The reaction, both locally and constitutionally, was far less intense than the preceding ones.

No further injection was given until April 18th. At this date, the change in the patient's condition was truly marvellous. Every vestige of the original ulcerations, which before the treatment were so conspicuous, had disappeared except one little point hardly larger than a pin's head, situated externally on the edge of the septum. The inner walls of the nostrils were perfectly clean and free from every trace of ulceration. New tissue had commenced to fill in at one or two points, and the entire external surface had a clean, natural look (although naturally scarified), aside from a possible exudation at one point on the right side of the nose very limited in extent.

An injection of 10 milligrammes of lymph on this date was followed by only a slight reaction. The temperature rose to 100.2°, while the local and general reaction was very slight as compared with those induced by previous injections.

In this case, then, so far as the treatment has progressed, we have a complete fulfilment of Dr. Koch's statements regarding the action of the lymph on lupus. What the final outcome will be time alone can determine, but at present there is every indication of a speedy and complete cure.

Why the remedy failed to bring about correspondingly pronounced reactions in the two preceding cases of lupus is difficult to determine. There can be no doubt that they were true cases of lupus vulgaris, although evidently in a more quiescent state than the case just described. Furthermore, the lymph used was the same in all three cases; in fact, in the case of lupus first described injections were made with five distinct samples of lymph without any noticeable difference in the result (April 30, 1891).

Obviously, any general conclusions regarding the efficacy of the remedy, to be of value, must be founded upon a larger number of observations than we have to offer. In view of this fact we refrain from drawing any deductions from the above results, but present them as a contribution which may aid in the formation of a true estimate of the value of the remedy.

THE TREATMENT OF LEPROSY, AS OBSERVED IN KASHMIR, BY NERVE-STRETCHING.

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Before proceeding with the subject-matter of this article, I have thought it proper to give a short description of the Valley of Kashmir, the beauties of which have been so often celebrated in prose and verse. The Valley of Kashmir, surrounded by snowy and lofty mountain ranges, is imbedded like a gem in the great Himalayan chain, stretching between latitude 33° 15′ and 34° 35′ N., and longitude 74° 10′ and 75° 40′ E. In form it is irregularly oblong, lying northwest and southeast, about 100 miles in length, with an average width of 20 miles. Its area is about 4500 square miles, and its average height is 5200 feet above the level of the sea. Its population is nearly 760,815. To Vigne a cursory view of the physical features of the valley gave an idea of its having been originally formed by the falling in of an exhausted volcanic region; but on detailed examination he agreed with the popular tradition that the valley was originally a large mountain lake. Whether the desiccation was due to volcanic action or otherwise, and whether it was gradual or sudden, are still moot questions. The mountains in and around Kashmir are chiefly basaltic in character, their usual formation being in some places composed of gray compact mountain limestone, in which marine fossils and shells are often found imbedded. That volcanic action is still at work beneath the surface of the valley is evidenced by the frequent shocks of earthquake. The soil of Kashmir is a very rich and fertile alluvium. Rice, cereals, and fruit trees grow luxuriantly. Numerous medicinal plants grow wild in the valley, such as ophelia chiretta, papaver somniferum, cannabis sativa, rheum palmatum, artemesia absinthum, aconitum ferox, and anthemis nobilis. This extensive alluvial tract is intersected by the river Jhelum and its numerous tributaries. There are also three large lakes in the valley. In the rivers and lakes fish are found in abundance. There are several mineral springs scattered over different parts of the valley, chalybeate and sulphurous.

The climate of the valley is very similar to that of the south of Europe. It is therefore well suited as a health resort to those whose constitution has been broken by the heat of the plains of India. To phthisical patients the climate is also admirably suited. The hottest months are July and August, and the coldest months are December and January, when heavy snow usually falls. There is a most lamentable want of ordinary sanitation in Srinagar, the capital of Kashmir. The Kash-

mirees are notoriously filthy and negligent of even personal cleanliness. The soil of Srinagar is saturated with the filth of ages. The people have a scrupulous respect for all old and insanitary practices, and any innovation is looked upon as an oppressive measure. Cholera is not endemic, but frequently pays visits in epidemic form, during which violated Nature wreaks its full vengeance. The inhabitants of the valley speak a distinct language. They are either Mohammedans or Hindoos, the former predominating. The Kashmirees are a fine race—strong, muscular, generally fair-complexioned, and with true Aryan features. Rice forms their staple food, which they eat twice daily with boiled vegetables. Meat is also eaten. Fish is freely used, either fresh or dried.

Syphilitic diseases are the scourge of Kashmir. The rate of infant mortality is very high on account of syphilitic diseases. The disease is so widespread among all classes of people that it has almost assumed the magnitude of a national calamity. Tuberculosis and rickets are very rare. Leprosy is by no means common. It is certainly met with, but the proportion of lepers to the general population is infinitesimal. During the last six years I have not met with more than fifteen real Kashmiree lepers, of which only two were Hindoos.

In the beginning of 1890 a census of lepers was taken in Kashmir. The revenue officers took it unassisted by medical officers, consequently it could not be very correct. It has no doubt included many cases of other diseases than leprosy and might have overlooked many cases in the incipient stage. The following was the result of the census:

Estimated population, 602,184. Total lepers, 202—male, 168; female, 34. Hindoos, 4; Mohammedans, 198.

The slopes of the hills between the flat ground and the limits of forests are a mixture of cultivating and grazing grounds and forests of cedar and pine, etc. These slopes are inhabited by a class of people called Goojurs, or cowherds, who keep buffaloes and cows. In winter these Goojurs live at the foot of the hills, and in summer in temporary huts on the mountains. The Goojurs are darker in complexion than Kashmirees. They speak a different language and their habits of life are different. Their food is Indian corn, or maize, and wheat. They eat buffalo meat. Living in the territories of the Maharajah of Kashmir, within which cow-killing is a heinous crime, they are not at all beef-eaters. They seldom get fish, as they pass the greater part of the year on the mountains. Among these Goojurs leprosy is a common disease. Lepers are looked down upon and not allowed to mix freely in society in the Goojur country. The lepers therefore usually come to Kashmir or go to adjoining British districts in the Punjaub for means of livelihood. The Punjaub is very hot in summer, and Punjabi lepers

find that during the hot season eruptions frequently break into ulcers, which heal in the temperate climate of Kashmir. So, annually a large number of Punjabi lepers flock into Kashmir during summer and live on the charity of the Kashmirees. Thus, though Kashmir itself is comparatively free from leprosy, opportunities for treating lepers are by no means rare in Kashmir.

During the last five years I have treated nearly 500 cases of leprosy, a larger portion of them having been treated as outdoor patients at the Maharajah's Hospital in Srinagar. I now proceed to give my opinion on some points connected with the disease which will, perhaps, be found different from that given by several eminent members of the profession. In the republic of the medical profession, however, even its humblest member has a right to record his observations; nay, it is his duty.

HEREDITY.—Heredity is no doubt an important factor in the causation of leprosy. Such is the opinion I have formed after careful inquiry among Goojur lepers. I have seen a family with three generations of lepers. I have not seen acquired leprosy in children. Of course, in many cases heredity could not be easily traced, but in all such cases unsatisfactory answers were elicited. To the question, "Was your grandfather a leper?" the answer was, "I cannot say, as he died before I was born;" or some such answer. There are no doubt cases of acquisition, but among the Goojurs inheritance plays a more important part than acquisition.

IS LEPROSY CONTAGIOUS?—I saw one instance of a wife acquiring leprosy from an affected husband. Five years after marriage, the husband showed symptoms of leprosy; after another five years the wife became affected. When I saw the couple they had no children. I have seen in a family the grandmother, an old woman, suffering from a very bad type of ulcerative leprosy, attended with fetid discharge and sloughing. The affectionate daughters and granddaughters nursed her without the slightest thought of themselves. The old woman died two years ago. None in the family was affected. From my experience I can cite no instance in which the disease was transmitted from a leper to any member of his family, with whom he lived together and mixed closely in social life, except the one in which the wife was affected. The Leper Asylum in Calcutta is situated in the midst of a populous part of the city, and—if it be not the case now—fifteen years ago I saw lepers coming out of the asylum and begging at the adjoining houses, especially at a public school in that locality, but no one ever heard of special prevalence of leprosy in that quarter of the town. I know of several houses in Calcutta in which among old household servants there are lepers. Though leprosy is not common among the Kashmirees, still Kashmir is resorted to by a large number of lepers for its climate and means of

livelihood. These lepers freely mix with the people, sit, eat, and pray with them (lepers are usually found at the doors of Moslem prayer-houses), and no precaution against contagion is thought of, still the disease does not spread among the Kashmirees. In India and in the northern hilly countries we find lepers freely mixing with their relatives, walking about in public streets; leprous husbands having progeny from their unaffected wives; in short, the public is exposed to the disease in every conceivable way. Does it extend in the proportion it ought if contagion by contact be admitted?

Of course, contagion by inoculation is possible, and often takes place in various ways. All the different ways by which syphilis can be passed from one individual to another extra-genitally hold good for leprosy. In India people usually have their feet and skin bare, and therefore there is every likelihood of inoculation. The question of compulsory segregation can only come where it is finally proved that leprosy is contagious by contact. It is no doubt a loathsome disease, with public feeling strongly against it. The word "leper" is synonymous with everything that is abhorrent. Whether this public opinion is right or wrong, we as scientific observers should lay aside our prepossessions, and steer clear of preconceived notions and prejudices. Then, again, it is difficult to conceive how segregation can be complete, even if it were tried for experimental purpose. Is it always easy to recognize the disease in its early stages? Is it not very common that early stages continue for a prolonged period, during which the contagion, if any, will be equally communicable as in later stages? Does it not sometimes baffle even experienced physicians to recognize and distinguish the disease from several forms of skin diseases and neuroses? Will not the rich try to evade, and the poor be submitted to unnecessary hardships?

It is not easy to conceive how isolation can be humanely carried out, and how it can be complete, regular, and perfect; and unless it is so its very object is defeated. I think, however, that, unless proved by fresh observations and experience, our present knowledge of the disease does not justify belief in contagion by contact.

HUTCHINSON'S FISH THEORY.—The Goojurs do not get fish. Since this theory first came to my notice in the pages of the *Lancet* I have always asked lepers if they have been fish-eating, and in the large majority of instances the reply was in the negative. The theory is untenable in India, where we do not find the disease more prevalent among fish-eating people than among abstainers from such food, as *vaisnabs*. The Kashmirees, among whom leprosy is rare, are fish-eating, both fresh, dried, and salted. In India European sportsmen, planters, etc., use largely preserved fish, but there are no facts to show that fish-eating ever produced leprosy among them. High-class Hindoo widows are strictly

prohibited from taking fish, but I have seen several cases of leprosy among them. But the fact that leprosy is common among Goojurs completely disproves the fish theory.

VARIETIES.—By far the majority of cases among Goojurs are of the anæsthetic type, characterized by diminution or complete loss of sensation of one or both extremities, with characteristic flush in the face and thickening of the skin. The eyelashes usually drop off. In many cases trifling symptoms continue for a prolonged period; in others anæsthesia becomes general, and ulcers of a trophic kind break out, sloughing takes place, gangrene may follow, and natural amputation of phalanges, fingers, or toes occurs. Wasting of muscle takes place. In cases of anæsthetic variety nodules form in groups, which, as a rule, remain long as such. In the hot climate of India these nodules ulcerate more quickly. These nodules are pathologically analogous to lupus, and that is the reason, I believe, that Koch's fluid is said to have done some good in certain cases of leprosy. Perhaps the bacilli are not affected, but the large lepra-cells are.

BACILLI LEPRÆ.—I have on three occasions searched for bacilli. In one instance I found them from lymph in a vaccinated leper. No doubt the bacilli are always present; my method of staining, etc., was perhaps not accurate. Methylene-blue was the staining reagent used. The figure in Green's *Pathology*, page 378, 7th edition, very faithfully depicts the bacilli.

TREATMENT.—In the treatment of lepers, chalmugra oil, gurjon oil, both internally and locally, neem (azadirachta Indica), and arsenic have been given trial. In the ulcerative stages of both tubercular and anæsthetic varieties local applications of gurjon oil or neem oil prove of some value in healing and checking fetor. Creolin does the same. These, however, have little or no power in arresting the progress of the disease.

In the anæsthetic variety I have practised nerve-stretching in fifty-seven cases. I am of the opinion that in the early stage nerve-stretching produces very satisfactory results in a large majority of cases. The result, however, I regret to say, is not lasting. Still the patient feels very much better after the operation, and leaves the hospital in an improved condition. It often happens that the ulcers heal rapidly, the general health of the patient improves. This treatment can, therefore, be safely called a palliative treatment. The following is an abstract of cases treated by me:

Abstract of Cases of Nerve-stretching for Leprosy at the Maharajah's Hospital, Kashmir.

No.	Sex.	Age	Variety.	Duration.	Period under treatment.	Nerve stretched.	Result.	Remarks.
1	M.	40	Anæsthetic.	5 years.	2 weeks	Sciatic.	No improvement.	
2	M.	35	"	2 "	1 week.	"	"	
3	M.	30	"	2 "	1 "	"	"	Gives history of heredity.
4	M.	33	"	1 year.	2 weeks.	"	Decided improvement.	
5	M.	40	Anæsthetic with tubercles.	2 years.	1 month.	"	Slight improvement.	
6	M.	40	Anæsthetic.	6 "	1 week.	"	No improvement.	Brothers.
7	M.	36	"	5 "	4 days.	"	Slight improvement.	Brothers.
8	M.	30	"	5 "	1 week.	Both.	"	
9	M.	35	"	3 "	2 weeks.	Sciatic.	No improvement.	
10	M.	35	"	2 "	2 "	"	"	
11	M.	36	"	4 months	1 week.	"	Decided improvement.	Patient left the hospital very well satisfied with the result of treatment.
12	M.	30	"	2 years.	6 days.	"	Improved.	
13	M.	33	"	9 "	5 "	"	No improvement.	
14	M.	19	Mixed.	8 "	1 week.	"	"	
15	M.	40	Anæsthetic.	7 "	2 weeks.	"	"	
16	F.	27	"	1 year.	1 week	"	Improved.	
17	M.	35	Mixed.	6 years.	1 "	"	No improvement.	
18	M.	29	Anæsthetic.	4 "	4 days.	"	"	
19	M.	30	Tubercular.	3 "	5 "	"	Improved.	
20	M.	55	Slight anæsthesia.	2 "	1 week.	"	"	
21	M.	40	Mixed.	2 "	1 "	"	"	
22	M.	33	Anæsthetic.	4 "	5 days.	"	"	
23	M.	35	"	5 "	2 "	"	No improvement.	
24	M.	37	"	1 year.	1 week.	"	Very satisfactory.	Anæsthesia disappeared.
25	M.	30	"	4 years.	1 "	"	Slight improvement	
26	M.	26	"	7 months.	1 "	"	"	
27	M.	29	"	1 year.	2 weeks.	"	"	
28	M.	40	"	8 years.	3 days.	"	No improvement.	
29	M.	40	"	10 "	5 weeks.	"	"	
30	M.	37	"	7 "	1 week.	"	"	
31	M.	45	"	3 "	2 weeks.	"	"	Nodules present.
32	M.	47	"	2 "	2 "	"	Slight improvement.	
33	M.	30	"	9 "	1 week.	"	No improvement.	
34	M.	35	"	7 "	1 "	Ulnar.	"	Ulcers breaking.
35	M.	35	"	10 "	4 days.	"	"	
36	M.	47	"	5 "	5 "	"	"	
37	M.	50	"	3 "	7 weeks.	"	Improved.	
38	M.	54	"	2 "	2 "	"	"	
39	M.	50	"	2 "	4 days.	"	"	
40	M.	47	"	1 year.	5 "	"	"	
41	M.	32	"	4 years.	3 "	"	No improvement.	
42	M.	33	"	7 "	2 "	"	"	
43	M.	25	"	2 "	2 weeks.	"	Improved.	
44	M	40	"	15 "	2 months.	"	Left hospital in same state as he came.	Ulcers all over foot and hand.
45	M.	35	"	3 "	1 month.	"	Slight improvement.	
46	M.	36	"	7 "	1 week.	"	No improvement.	

Total number of cases, 45. Improved, 14. Slightly improved, 8. No improvement, 23.

LAMNECTOMY: A REVIEW OF ONE HUNDRED AND THREE CASES OF SPINAL SURGERY.[1]

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It seems not out of place to enter a protest against the further use of the term trephining in connection with the spine. As a matter of fact, at the present time the trephine is seldom used for the removal of the posterior arches of the vertebræ, having given place to the mallet and chisel, or preferably to the rongeur forceps. I should prefer to speak simply of operations upon the spine, resection of the laminæ, or perhaps lamnectomy (Λαμνια, a plate, a lamina; ἐκτεμνω, to cut out), instead of laminectomy,[2] which has been employed lately. This term has the advantage of being derived from two Greek words, instead of a Latin word and a Greek ending. The claim advanced by some recent authors that the first operation upon the spine was performed by Louis[3] in 1762 may be correct in part; he may deserve the credit of having first cut down upon the spine and of removing comminuted fragments of bone, but Louis[4] himself says that his patient suffered a fracture of the spine from a gunshot wound, and consequently had a compound fracture. In the present condition of surgery there can be no question of the advisability of operative interference in such cases as this, and therefore it is hardly necessary to consider Louis's case further; and as we shall have no reason to refer to compound fractures of the spine again, this case, together with the large number of others that might be collated, is passed over.

There can be no doubt that the credit of having first operated upon the spine (in 1814) belongs to Mr. Henry Cline,[5] although the operation had been suggested by Heister[6] and others. Between that date and 1882, when Maydl,[7] of Vienna, attempted to remove some of the dorsal arches and unite the severed ends of the spinal cord, operations upon the spine were undertaken a number of times with little encouragement. In 1885 R. T. Morris,[8] of New York, made a similar attempt to reunite

[1] Read before the Medical Society of the State of New York, February 4, 1891.

[2] Lane: London Lancet, July 5, 1890, p. 11.

[3] Chipault: Gaz. des Hôp., September 13, 1890, p. 809.

[4] "Remarques et Observations sur la Fracture et la Luxation des Vertèbres," Arch. Gén. de Med., 2d series, vol. xi. p. 397.

[5] South's Chelius, London, 1847, vol. i. p. 539.

[6] A General System of Surgery. Seventh edition, Book I., chap. vi., p. 143. London, 1745.

[7] Albert: Lehrbuch der Chirurgie, Vienna, 1884, vol. ii. p. 55.

[8] Annals of Surgery, vol. iii. p. 490.

the separated portions of the cord, but both these operators found the procedure impracticable. In 1889, Abbe,[1] acting upon a suggestion of Dana's, opened the spine with the same idea, or if failing in this, intending to make an attempt to unite some of the nerve-roots of the inferior detached portion of the cord to the posterior nerve-roots of the superior portion, hoping thus to furnish a means of communication between the severed sections. The difficulties of the operation proved too great to be overcome in this particular case, and the attempt had to be abandoned. Duncan,[2] in 1889, drew the sheath above and below a crushed portion of the cord together and stitched them there, thus relaxing the injured portion, but no improvement followed.

In spite of the sweeping denunciations of the earlier surgeons, and the bitterness with which its opponents have striven to prove the operation unjustifiable, we now have a sufficient amount of material at hand from which to deduce conclusions. Successful results are recorded not only in cases of traumatic injury, but in Pott's disease, tumors, and intra-dural section of the posterior nerve-roots for intractable neuralgias. We have tabulated all the cases up to date (February 28, 1891) whose records we have been able to find. Several of our cases have not yet been reported, and I am indebted to Drs. A. G. Gerster, J. A. Wyeth, C. K. Bridden, A. McCosh, C. McBurney, J. E. Kelly, R. T. Morris, and F. A. Manning, of New York; Geo. Ryerson Fowler and D. Myerle, of Brooklyn, and C. B. Stemen, of Indiana, for kindly placing the records of their unpublished cases at my disposal. I am also indebted to Dr. Southgate Leigh, of Mt. Sinai Hospital; Dr. Frank Le Moyne Hupp, of the Presbyterian Hospital; Dr. A. M. Newman, of Charity Hospital; and Dr. O. A. Schultze, of Roosevelt Hospital, for assistance in completing some of the histories. In this table we find one hundred and three traumatic cases, with fifty-eight deaths, of which thirty have occurred since the introduction of Listerism, and the other twenty-eight prior to that period. An analysis of these thirty cases shows that those of Halsted,[3] both of Morris's,[4] Hardie,[5] Duncan,[6] Allingham,[7] Bell,[8] Pilcher,[9] Jaboulay,[10] and McCosh,[11] either died after the lapse of considerable time, or had other injuries which rendered a favorable result impossible. This leaves, therefore, only twenty cases where the operation could have had any effect upon

[1] New York Medical Record, July 26, 1889, p. 85.
[2] Edinburgh Medical Journal, March, 1889, p. 830.
[3] Philadelphia Medical News, January 3, 1885.
[4] Annals of Surgery, loc. cit., and personal communication.
[5] Thorburn: A Contribution to the Surgery of the Spine, p. 20. [6] Loc. cit.
[7] Brit. Med. Journ., 1889, vol. i. p. 838.
[8] English Monthly Med. Journ., June, 1890.
[9] Annals of Surgery, vol. xi. p. 186.
[10] Lyon Médical, June 22, 1890, vol. lxiv. p. 265. [11] Personal communication.

the ultimate result. In these last, one of Jones's[1] was found to have suffered a crush of the cord opposite the 4th, 5th, and 6th cervical vertebræ, and would probably have died, even without the operation, from the traumatic inflammation of the cord involving the point of origin of the phrenic nerve. The same condition of phrenic disturbance existed in one of Jaboulay's, one of Bridden's, one of Bell's and Manning's, and Keetley's[2] cases.

Of the twenty-eight not treated antiseptically: Tyrrell's,[3] Holscher's,[4] Rogers's,[5] Laugier's,[6] Hutchinson's,[7] Potter's second case, McDonnell's,[8] and all three of Nunneley's[9] had other injuries to which the fatal issue could be traced, making eight of the twenty-eight that can be attributed to other causes than the operation.

If now we consider all the deaths due to the operation, we find that in the antiseptic class, 50 per cent. survived; but if we exclude those enumerated the mortality would be only 25 per cent. In the non-antiseptic series, including all the cases, we have 63 per cent. of deaths, or excluding those due to other injuries, 45 per cent. In this latter series we have one cure, 2 per cent.; seven partial recoveries, 16 per cent.; two results unknown, 4 per cent.; and five showing no improvement, 11 per cent. In the first series, however, there are four cures, 6 per cent.; fifteen partial recoveries, 25 per cent.; one unknown, 1 per cent.; and eleven no improvement, 18 per cent. This is a more favorable showing than Ashhurst was able to make from his table of forty-three cases.[10] He had 72 per cent. of deaths, 9 per cent. not benefited, 9 per cent. improved, and 9 per cent. whose results were unknown, and no cures. Thorburn's[11] statistics of 61 cases did not include those of Goldsmith,[12] Boyer,[13] Massoneuve,[14] Eve,[15] Halsted,[16] Pinkerton, Morris,[17] nor any later than June 29, 1889.

It is interesting in this connection to compare the statistics of the antiseptic class with those of fractures treated conservatively. Thus, Gurlt[18] reports 217 deaths out of 270 fractures, over 80 per cent.; while

[1] Thorburn, loc. cit., p. 26.
[2] Brit. Med. Journ., 1888, vol. ii. p. 421.
[3] Tyrrell: Cooper's Lectures on Surgery, 1825, vol ii. p. 20.
[4] Hannov. Annal f. d. ges. Heilk., Bd. iv. 1839, p. 330.
[5] Amer. Journ. Med. Sciences, O. S., vol. xvi. p. 91, 1835.
[6] Bull. Chir., vol. i. p. 401.
[7] Amer. Med Times, 1861.
[8] Dublin Journ. Med. Sci., vol. xl.
[9] Med. Times and Gaz., August, 1869.
[10] International Encyclopædia of Surgery, vol. iv. p. 890.
[11] Surgery of the Spinal Cord, 1889, p. 144.
[12] Gross's System of Surgery. Second edition.
[13] Heyfelder: Traité des Resections (trans. by Boeckel), p. 244.
[14] Chipault: Gaz. des Hôp., September 13, 1890, p. 809.
[15] Philadelphia Medical News, January 3, 1885.
[16] International Encyclopædia of Surgery, vol. iv.
[17] Loc. cit.
[18] Handbuch der Lehre v. d. Knochenbruchen, 1864, vol. ii. p. 172.

Burrill, from the tables of the Boston City Hospital,[1] has compiled 82 cases with 64 deaths, 79 per cent. Of the 22 per cent. of recoveries, only 11 per cent. were satisfactory, the other 11 per cent. being completely disabled. Of the fatal cases the greater number died within a few days.

In addition to the one hundred and three traumatic cases we have tabulated thirty-nine of Pott's disease, eleven tumors, and five intra-dural nerve-sections, making a total of one hundred and fifty-five operations upon the posterior arches of the spine.

We have found that the percentage of deaths in all the cases operated upon for the relief of symptoms due to traumatism was 56 per cent.; but the percentage of all the other classes taken together is but 26 per cent., showing that the mortality is 30 per cent. higher in the former than in the latter series. The mortality of traumatic cases operated upon prior to Listerism was 63 per cent., since Listerism 50 per cent.

In the cervical region there are in the non-antiseptic class ten cases. Seven died; five from the spinal injury, and two from other causes; two, one of resection of the sixth and the other of the fifth and sixth arches, made partial recoveries, while one recovered from the operation, but having sustained a complete crush of the cord, showed no improvement in symptoms.

In the antiseptic series of eighteen there were fifteen deaths; one of these, however (Morris's), survived ten months, and should be included among the unimproved. In addition to this, one of Hardie's, one of Jones's, one of Bell's, one of McCosh's, and Manning's were practically hopeless at the time of the operation, while in Bell's first case the author says "the operation did not seem to complicate the case in any way." Including in the statistics all these cases except Bell's, in which there were other injuries that would probably have proved fatal, we still have thirteen deaths due to the operative manipulation, 72 per cent. Excluding all those enumerated, the percentage is only 44. In this series there is one cure, 5 per cent.; one improved, 5 per cent.; and two unimproved, 11 per cent.

In the dorsal region there were seventeen cases operated upon prior to the introduction of antisepsis, with twelve deaths; two of the latter should not be included, one having died of general œdema after fifteen weeks, and the other of fractured ribs and pyo-pneumothorax, making 58 per cent. of deaths due to spinal injury. Two cases, 12 per cent., show incomplete recovery, and three, 18 per cent., no improvement.

In the second series (antiseptic) there are twenty-eight cases, with eight, 28 per cent., deaths. One other death occurred at seven months, and another at five months after the operation, and consequently they

[1] Medical Publications of the Harvard Medical School, 1887.

are included in the unimproved class. Of the remaining cases, nine, 32 per cent., including the two cases that died after some months, were unimproved. Nine cases were improved, and of this number, one (McBurney's) is still under treatment and improving. Two, 7 per cent., are reported as cured.

In the antiseptic class there are four dorso-lumbar cases, two of which were fracture-dislocations in which reduction was almost impossible; in one as soon as the traction was removed the deformity was reproduced. Three of the cases died, both dislocation cases, one of which had other injuries that would alone have proven fatal; the third case lived four months and should consequently be included among the unimproved cases. The fourth case was not improved.

In the lumbar region, out of four cases in the old series, three, 75 per cent., died, and one made an incomplete recovery.

There are five cases in the antiseptic class in this region, and of these two died. In one the cause of compression was not found at the operation, and the second died of other injuries and should not be included in the death-rate, leaving only four cases to be considered, with 25 per cent. fatal. One case was improved, one was cured, and one showed no improvement. In this series I have to report the following case:

Man, aged twenty-nine years, Swede, engineer. On April 20, 1889, while on his hands and knees removing a block from under a gas generator weighing about two tons, the machine toppled over, the flange striking him in the back and pressing him down until it was arrested by an upright pipe which was fixed in the floor. He was unable to move from this position until the machine was raised. When he was pulled out he was laid on his back and "felt a queer sensation in his feet, which were numb." In a few minutes he began to have severe pain in the back, which was increased by motion, and had no control over his right leg. He was taken to Roosevelt Hospital. For the following notes of the case during his stay in the hospital I am indebted to Dr. Charles McBurney, who kindly placed them at my disposal. "On admission the spines of the upper lumbar vertebræ have a feeling of retrocession and there is also obscure crepitus, obscured by blood-clot beneath the skin."

During the next few days he lay on his side and retention of urine and of feces was a prominent symptom; the urine showed a large number of hyaline casts and albumin.

On the 27th, seven days after his admission, his bowels responded copiously to medicine, and it was found that he had no control over his rectum; the casts had disappeared from the urine.

"*May* 4. There seems to be paralysis of the extensors of the right foot. The patellar reflexes are responsive and apparently diminished.

"10*th*. The bedsore over the sacrum (due to feces irritating), which started ten days ago, is looking better.

"20*th*. Condition unchanged. Still catheterized. Movements of bowels are involuntary but conscious. Semi-paralysis of right foot. Temperature not taken. No pain except when patient attempts to roll

on his side. The extensive ecchymosis is fading, but the parts are very sensitive to pressure.

"*June* 2. Still catheterized. Discharged, improved, June 3d."

On July 29, 1889, I first saw the patient at his home. He was confined to his bed, his right thigh slightly drawn up and the leg flexed. There was little or no atrophy, but loss of sensation and paralysis with incontinence of feces and of urine. A bedsore a little larger than a silver dollar existed over the sacrum. As he was suffering with a severe diarrhœa, it was impossible to make a careful examination for several days, but on August 7th he had recovered sufficient strength for me to examine him thoroughly. There was then a tumor of some size over the lumbar vertebræ, and consequently no depression or other sign of fracture could be discovered. I suppose this thickening was due to the hæmatoma that existed at the time of the accident. He had pain running down the right leg and in the toes of the foot on that side, and still had incontinence of urine and feces. He was able to stand by holding on to the furniture, but could not stand erect. His right leg was flexed on the thigh and his body bent at about 20° from the perpendicular. Anæsthesia was present over the region indicated in the figure.

Electrical reactions are shown in the following table:

Left galvanic.	Left faradic.		Right faradic.	Right galvanic.
KCC>AnCC	50	Peronei	Lost	Total loss 8 m.amp.
KCC>AnCC	52	Anterior tibial	Lost	" " 10 "
" "	54	Posterior tibial	Lost	" " 8 "
	Lost	Glutei	Lost	
	Preserved	Tensor vaginæ femoris	Preserved	
	Diminished	Posterior thigh muscles	Diminished	
	40	Adductor	69	
	70	Biceps	72	

Reversals at 10 milliampères; no reaction.

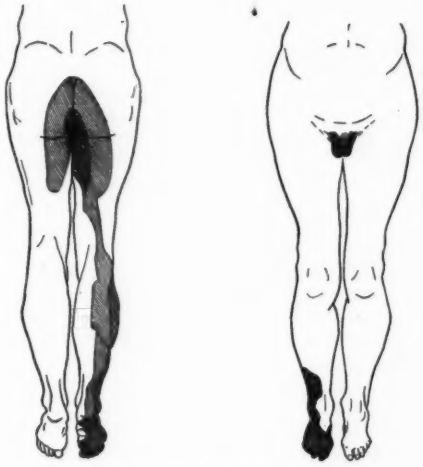
Is able to have sexual intercourse, without emission or sensation, but occasionally has an emission during sleep with the usual sensations. Has some voluntary control over the muscles of the thigh, but practically complete paralysis of the leg. Atrophy very slight. Knee-jerks present and about normal; superficial reflexes over paralyzed areas wanting; no ankle clonus; temperature of right leg lower than left and skin quite dry. Being convinced that there was compression in the lumbar region, I advised operation at this time, but the patient refused. He was, therefore, put upon a course of massage and electricity. In November, 1889, he complained that the pain in the lumbar region running down the back of the right leg and foot was increasing, although his condition otherwise remained much the same.

In May, 1890, he concluded to be operated upon. At this time the thickening over the lumbar region had disappeared, and it was possible to make out a very slight depression at the third lumbar vertebra.

With a view to having my examination and conclusion corroborated,

I requested Dr. M. Allen Starr to see the case with me. The following is his report:

Examined by Dr. Starr, May 21, 1890. The man walks with much difficulty, dragging the right foot and being unable to raise it from the



Dark shading—area of complete anæsthesia.
Light shading—area of partial anæsthesia.

ground. The entire pelvis appears to be so displaced that the right hip is higher than the left. He has considerable voluntary power over the muscles above the knee, but those below the knee are almost completely paralyzed. He cannot turn or move his ankle or flex or extend his toes. The entire right extremity is smaller than the left, the difference being half an inch in the middle of the thigh and one inch in the middle of the leg. In the paralyzed muscles there is a complete loss of faradic reaction, and no response to interruptions of a galvanic current of ten milliampères in strength. There is a loss of tone in the muscles paralyzed, they are flabby and have lost their mechanical excitability to percussion. The muscles are nowhere rigid or contractured.

Reflex action.—The knee-jerks are equal on both sides and normal in degree. There is no ankle clonus. Plantar reflex to tickling is absent.

Sensation.—There is complete anæsthesia of the penis, perineum, anus, and of a saddle-shaped area over both buttocks reaching down to within two inches of the popliteal fossa. On the right side the anæsthetic area extends downward over the back of the leg and over its outer side, and includes the entire foot, sole and front, excepting along the inner side, as determined by tests with cotton and with needles. The same area is insensitive to heat and cold. He complains of severe pain over the lower sacral region, and in this area there is a bedsore. The temperature of the right leg is perceptibly cooler than that of the left.

Automatic action.—There is imperfect control of the bladder and rectum. He has erections and has had connection since his injury, but there is no emission during the act.

Diagnosis.—Injury and compression of the cauda equina at the level of the lower lumbar vertebræ.

He was also examined at this time by Dr. Robert Abbe, who concurred with the opinion expressed by Dr. Starr. On July 5th, assisted by Drs. Abbe, T. Halsted Myers, and C. E. Denison, he was etherized and the operation performed. An incision about seven inches in length, having the third lumbar vertebra as its centre, was made along the right margin and close to the spinous processes; the incision was carried rapidly down to the laminæ, where it became evident that there was an ununited fracture of the spinous process of the third lumbar vertebra. The spines of the second and fourth were cut off close to the laminæ with Liston's bayonet forceps, and the muscles were dissected back from the arches on both sides by means of a periosteotome. The severed spines were left attached to the flaps of the left side. The posterior arches of the three vertebræ were then removed by gnawing them off piece by piece with rongeur forceps, and we were able to make out a slightly depressed fracture of the right lamina of the third lumbar vertebra, which was surrounded by considerable callus, especially on the anterior surface. This somewhat diminished the size of the vertebral canal. A probe was passed in both directions in the canal to make sure no further compression existed either above or below the point of operation. A slight laceration in the dura, which was healthy and otherwise not opened, allowed the escape of some cerebro-spinal fluid. The hemorrhage, quite severe in the first two or three minutes of the operation, was controlled by compression with sponges and retractors. The wound was closed by means of deep and superficial catgut sutures, a drainage-tube being inserted at the lowest point of the incision, and the spinous processes were left attached to the left flap. The etherization occupied one hour and twenty minutes. There was practically no shock. The next day all pain had disappeared, and the dressing, which was soaked through, was removed and the drainage-tube withdrawn. There was some irritation in the bladder with retention of urine, and a bedsore below the original one, which had been threatening for some time, became fully developed. Five days later, however, the wound was healed and I was able to make a test of the anæsthetic area, which was slightly improved. The bedsores were better and he had less cystitis. On July 19th he was allowed to sit up. The subsequent course of the case showed simply a progressive improvement, until, at the present time, although still suffering from some paralysis and anæsthesia, he is able to remain at work for the usual number of hours, either running his engine or in the bottling-room of a soda-water establishment in New York. He has never worn any retentive apparatus and has never suffered inconvenience from the condition of his spine.

In seventeen of the cases the dura was opened and cerebro-spinal fluid escaped; six of these died. Of these six, one had a ruptured diaphragm with hernia of the stomach, etc.; another lived seven months, but the wound healed in about two weeks; one lived eighteen

days; and in one the cause of the compression was not removed. Three of the cases may be thrown out of consideration—leaving three, and one of these doubtful, that might possibly have been fatal in consequence of the escape of the cerebro-spinal fluid. Several cases, notably Duncan's[1] and Horsley's,[2] of spinal tumor, have illustrated the fact that the escape of this fluid may continue for a considerable time yet offer no obstacle to favorable progress. It has drained away in considerable quantities in cases of spina bifida that have been subjected to operation, and in several cases of tumor of the spine and of intra-dural section of the posterior nerve-roots.

Two conditions present themselves for consideration in deciding whether the operation should be done early or whether some time should be allowed to elapse. If undertaken at once, there is danger of interference where a spontaneous cure would result if the patient were left alone, or where a complete destruction of the cord renders any operative interference useless. If, however, operation be delayed too long and compression allowed to continue, a degeneration may result which would be as serious as though the functions of the cord had been destroyed by the original injury. This question of the selection of the proper time for operation is, therefore, a most important one. Lauenstein[3] says: "If after the lapse of six or ten weeks there is incontinence of urine with cystitis or incontinence of feces, and especially if there is also the development and spreading of bedsores, but little is to be hoped from the unaided efforts of Nature." And Thorburn advances practically the same proposition in injuries to the cauda equina.[4]

In determining the influence of time upon the operation, there are fifty-one antiseptic cases where the time that elapsed between the injury and the operation is stated. Out of this number twenty-four died and twenty-seven recovered from the operation. Within the first eight days after the injury twenty-four of these were operated upon, with a mortality of twenty-one (all but three of the deaths) against three recoveries. In the non-operative cases it is also true that the greatest number of deaths occur within the first few days. In one of the cases the cause of death is given as myelitis reëstablished by the operative manipulation.[5] It is impossible to draw any conclusion with regard to the effect of myelitis in the delayed cases from the histories I have been able to study.

From the result of my study of these cases I am inclined to agree with Horsley,[6] that operation should be undertaken at once "in all cases

[1] Loc. cit. [2] Trans. Med.-Chir. Soc., vol. lxxi. p. 377.
[3] Centralblatt für Chir., 1886, No. 51, p. 888.
[4] Surgery of the Spinal Cord, p. 162.
[5] Pinkerton: Phila. Med. News, January 3, 1885.
[6] Brit. Med. Journ., Dec. 6, 1890.

where displacement or crepitus indicates compression, and where extension directly after the accident clearly fails to reduce the deformity," provided there are symptoms present which indicate interference with the functions of the cord. In other cases I should wait until the shock following the injury had been overcome. During this time, however, the patient's condition should be most carefully watched, and at the first indication of any symptoms pointing to an extension of the interference with the action of the spinal cord, whether that interference be due to hemorrhage or to myelitis from compression, to callus, or to the exudation of lymph, the patient should be subjected to operation at once. It is of course unnecessary to say that no interference would be considered in any case where there was or seemed to be any amelioration of the patient's condition so long as that improvement continued.

Hutchinson,[1] in his conclusions based upon twenty post-mortem examinations, says: "Permanent compression of the cord or of any part of it is very rare, not more than one in ten, and as most fractures in this region are due to bends, fractures of the laminæ are of little consequence and never cause compression. Instances of great displacement sometimes occur and can rarely be benefited by operation, while cases in which during life there is the greatest displacement are not always the most serious." He, in common with Legros Clark,[2] considers pyæmia and spinal meningitis the principal reasons for non-interference. "To weaken still further the remaining connection of a broken spine," says the latter, "to convert a simple into a compound fracture, to expose the sheath and possibly the cord itself to the risks attending the period of repair, cannot be regarded as matters of indifference." White[3] sums up the possible dangers as follows:

1st. Disturbance of the cord is more or less involved in almost every form of operative procedure, and its exact importance is as yet unknown.

2d. The hemorrhage from the external and internal spinal plexus of veins.

3d. Laceration of the membranes, the risk of which accident would, of course, be increased if they were adherent to the bony walls of the vertebral canal.

4th. The danger from etherization, which is much increased by the prone position of the patient and by the paralysis of the abdominal walls.

Horsley considers sepsis the only real danger.

Chipault, as a result of a further experimental study of the points advanced by Hutchinson, comes to the same conclusion, but from a

[1] Clinical Record and Reports of London Hospital.

[2] British Medical Journal, vol. ii. pp. 49–52.

[3] Annals of Surgery, 1889, vol. x. pp. 1–39.

clinical point of view we find that the cases of Cline, Laugier, Tillaux,[1] Maydl, Horsley, both of Jones's cases, Abbe, Jaboulay, Pilcher, and McCosh, apparently fulfil these conditions, while those of Mayer,[2] McDonnell, Maunder,[3] Lucke,[4] Halsted, Lauenstein, Hardie, Duncan, Péan,[5] Abbe, Jaboulay, Dawbarn,[6] Wyeth, and my own, show that the bone either did not spring back to place, or that the depressed laminæ were the compressing factors. It is clear, from a clinical standpoint at least, that the statement made by Hutchinson, with regard to the bone as the compressing agent, is too radical; for out of thirty-five cases, fifteen more than Hutchinson reported, in which the cause of compression is given, we find eleven due to temporary, and thirteen to continued bony displacement.

In four cases the compressing cause is stated as extravasation of blood (Oldknow,[7] G. W. Jones,[8] Stephen Smith,[9] and Willett[10]), and Pilcher's, in addition to the crush of the cord, had two extra-dural hemorrhages, a condition which Hutchinson said he had never seen "to the extent of possible compression, and in the majority of cases little or none."

Of the objections of Legros Clark little need be said. Antisepsis, with its improved technique and more careful observation and treatment of operative wounds, has swept away the dread of septic infection; we have already proven that a free incision of the dura mater has little or no effect upon the result, and so far there are only two cases in which it has been necessary to apply a plaster-of-Paris jacket at any length of time after the injury. In my case with the posterior arches of three lumbar vertebræ removed, the man has returned to his work and is able to do an ordinary day's labor. Morris's case, too, which died ten months after the operation, was found to have a dense mass of fibrous tissue filling in the place from which the bone had been removed; and Page,[11] in a case operated upon for Pott's disease, reports that the site of the removed arches was apparently filled with solid bone.

There can be no doubt that disturbance of the cord is more or less necessary in all operative cases. How much effect this has upon the

[1] Bull. Gén. de Thérap. Méd. et Chir., 1866, p. 202.

[2] v. Walther and v. Ammon: Journ. der Chir., Bd. xxxviii.

[3] Lancet, 1867, vol. i.

[4] Werner: Die Trepanation der Werbelsäule, Strassburg, 1879; Rev. des Sci. Méd., April, 1880.

[5] Brit. Med. Journ., 1888, vol. i. p. 672.

[6] N. Y. Med. Journ., June 29, 1889, p. 711.

[7] Cooper's Fractures and Dislocations, 1822.

[8] Med. Times and Gaz., 1856, vol. ii. p. 86; Brown-Séquard: Dis. Central Nervous System, p. 255.

[9] Phelps: N. Y. Journ. Med., vol. vi. p. 87.

[10] St. Barthol. Hosp. Reports, vol. ii. p. 242.

[11] London Lancet, Dec. 1890, p. 1210.

subsequent course of the case cannot be told from existing data. In one of McBurney's cases, in Page's case of Pott's disease, and in my case, the symptoms were increased for a few hours, and yet it is impossible to say how much of this was due to shock after the operation, and how much to disturbance of the cord. In Page's it is probable that it was due to concussion from the use of the mallet and chisel in removing the bone.

It is also probably true that the dangers of etherization are somewhat increased in cases where there is paralysis of any portion of the respiratory apparatus, but the only case reported in which this seemed to affect the result was Pilcher's, where the injury was practically hopeless.

Thorburn[1] in his *résumé* of the indications for operative treatment founded upon his sixty-one cases of fracture, says: "The operation of trephining the spine for traumatic lesions, as compared with the lesion it is intended to relieve, does not present any very great dangers and appears unlikely to increase the gravity of the prognosis, but as both *a priori* argument and the results of published cases show that it is unlikely to be of service, it should be abandoned, except in cases of injury to the cauda equina, and that in the latter, on the other hand, it will probably prove to be an eminently justifiable and serviceable procedure."

Adopting these views, we should condemn the 30 per cent. or more of cases that have been shown to be relieved under the present methods of operating, as compared with the statistics of Gurlt[2] and Burrell,[3] to death, or to a miserable existence, without hope of relief. If, on the other hand, we do undertake an operation we increase the number of those improved 20 per cent., and add to the unimproved only 13 per cent. Horsley[4] reports only one death out of nineteen cases of lamnectomy. We must conclude, then, that the procedure is not only justifiable, but eminently proper.

The operation is evidently contra-indicated in all cases where the patient has not recovered from the direct shock of the injury; where the cord is completely crushed or severed, whether by a simple blow from the displaced bone, which has sprung back to its place, or from direct and continued compression; in all cases where improvement has appeared early and is progressing; and, where a severe traumatic myelitis is still present or but just controlled. It is indicated, on the other hand, in all cases where improvement has ceased and the patient is still helpless, and where there is reason to think that the disability is due to compression rather than to complete degeneration.

It is essential in discussing this subject to fully appreciate the symptoms indicating compression or destruction of any part of the spinal cord. Interference with the voluntary action of the muscles places them

[1] Spinal Surgery, p. 161. [2] Loc. cit. [3] Loc. cit. [4] Loc cit.

entirely under the control of the reflex centres in the cord, causing the affected limbs, owing to the difference in strength of the various groups of muscles, to take certain well-defined positions.

In regard to position, Starr[1] says: "If the lesion is near to and below the third lumbar segment and irritates it, but does not destroy it, the patient is likely to lie with the thighs drawn up and the legs flexed. If the lesion is above the third lumbar segment he will lie with the thighs and legs extended, unless the lesion produces great irritation, as in the last stages of lateral sclerosis, when the thighs and legs are flexed and adducted. If the lesion is about the two lower cervical segments and irritates the fifth and sixth, he will lie with his arms abducted about at a right angle, his forearms flexed on the arms, and hands supinated or their position dependent upon gravitation, and fingers flexed. If the lesion is about the middle cervical segment as high as the fourth, the arms will lie at the sides and cannot be moved." Bowlby[2] has observed the condition of the reflexes in twenty-one cases of cervico-dorsal fracture, all but one confirmed by autopsy; in the other twenty cases, where there was a complete transverse destruction of the cord, there were no reflexes nor rigidity of the muscles. The superficial reflexes were also generally lost immediately after the accident, although this was not always true. Unlike the deep reflexes, too, the superficial reflexes may return. "On the other hand, when the cord has been injured and when it is compressed, but when its continuity has not been entirely interrupted, the reflexes are not only preserved, but may be, and generally are, exaggerated." Bastian first made this observation as early as 1882, and again in a recent paper.[3]

As a result of this investigation Bowlby says: "Where there is a complete loss of deep reflexes there is probably a total transverse lesion; but when these reflexes are present the cord is certainly not completely crushed." "If the exaltation of the reflex power," says Tillaux, "has been considered as a sign of destruction of the dorsal or cervical cord, I think that the absolute abolition of these reflexes in the cases of fractures in the lumbar region would be generally an indication of the destruction of the medullary substance. I consider, therefore, that the persistence of the reflex action in lumbar fractures would be a favorable sign and its abolition an unfavorable one."

Starr says: "Examine for an area of anæsthesia corresponding to the sensory nerve, along which the impulse is carried to the segment, or for a condition of paralysis with atrophy and reaction of degeneration in the muscles supplied by the nerve which conveys the impulse from

[1] Familiar Forms of Nervous Disease.

[2] Med.-Chir. Trans., 1890, vol. lxxiii. p. 313.

[3] Ibid., p. 151.

the segment. If neither of them is found alone the segment is probably diseased. In crushed injuries the limbs are flaccid, the tendon reflexes abolished, and there is ankle clonus and rigidity."

In all cases the motor paralysis and anæsthesia will vary with the location and extent of the spinal lesion, but, as a rule, both are present to a greater or less degree. If, now, we have a complete motor and sensory paraplegia below the distribution of the nerves arising in the segment above that involved in the injury, with paralysis of the rectum and bladder, abolition of the reflexes whose centres are below the level of the injury, with rapid atrophy of the muscles, which are also flabby and relaxed, and which give the reaction of degeneration, the probabilities are that there is a total destruction of the cord. If the reflexes are present and controlled or exaggerated; if the atrophy is gradual and not very great, due to lack of muscular exercise, even though there is more or less trophic disturbance, anæsthesia and paralysis, and the reaction to the electric current is arrested in the paralyzed areas, the probabilities are that there is compression, rather than destruction, of the cord.

The methods of operating have varied with different surgeons. Cline, in the first case, made two parallel incisions on either side of the spinous processes, and then, having retracted the muscles, removed the spines before attempting to cut through the arch. Horsley makes a similar use of the double incision and then makes a cut at right angles to the first through the lumbar aponeurosis and muscles. This subcutaneous incision is placed about the centre of the field of operation and is employed to increase the retraction of the flaps. Bullard and Burrell and Dawbarn have employed an H incision, placing the two arms of the H in the vertebral grooves perpendicular to an incision carried across the median line at the point of greatest deformity. Demons used a V-shaped incision, the arms of the V passing on either side of the vertebral column. Morris employs a crucial incision, but the majority of the operators have employed the two parallel incisions. Abbe uses a single incision on one side and close to the spinous processes, cutting them free from the laminæ and leaving them attached to one of the flaps. I prefer this method of operating because it occupies less time, causes less hemorrhage, and can be completed without disturbing the interspinous ligaments. The hemorrhage must be a matter of careful consideration, since it is for a few minutes usually copious and very general. The incision should be carried at once and very rapidly down to the laminæ, and then the wound should be packed firmly for a minute or two. This will arrest the bleeding in great part and will enable the operator to see and ligate any arterial branches that may continue to spurt. The flap on the side of the spinous processes with the incision can then be dissected away from the arch until the articular and transverse pro-

cesses are in full view. The spinous processes can then be cut away at their bases with Liston's forceps, and the flap on the opposite side, including the spinous processes, can be dissected away in the same manner as the first.

The methods of removing the laminæ have differed very materially. Bullard and Burrell used a surgical engine, which, with the usual facility of most of these labor-saving inventions in surgery, broke down at the critical moment, and the removal was completed by means of an osteotome. The trephine and Hey's saw are also used. The reason given for the employment of these devices is that buttons of bone can be preserved and replaced. In Page's case of Pott's disease, where the mallet and chisel were employed, every blow of the mallet caused involuntary muscular twitchings in the limbs, and consequently may have been the cause of the increased symptoms exhibited by the patient after the operation. So far as the replacing of the bone is concerned, I do not think it has any important bearing on the subsequent course of the case. In fact, so far, only two cases—Thompson's and McBurney's, unless we also include Page's—in which the tubercular disease in the body of the vertebra was not removed, have required the application of any apparatus to strengthen the spine. In the latter the site of the operation is reported to have filled in with bone. It seems to me much more satisfactory, both as regards time and the saving of concussion, to employ the rongeur forceps to remove the laminæ; and for this purpose several different pairs should be provided, a straight pair being especially useful. It is best in every case where the cause ot the compression is not found to be extra-dural, to open the membranes and ascertain if there is any difficulty between them and the cord. When this is done, Mr. Horsley says, "the anæsthesia should be very profound, because the dura is extremely sensitive, and any motion at this time might prove fatal to the operation." There can be no doubt but that the anæsthesia should be complete. The danger of causing involuntary muscular action has been proven, by Abbe's case of nerve-section, where the dura was opened without any anæsthetic, to be due rather to irritation of the posterior columns of the cord than to the sensitiveness of the dura.

When the membranes are opened they should be closed very carefully by means of fine catgut. Some operators have not stitched the dura, but in view of the irritating qualities of the cerebro-spinal fluid this precaution to prevent a fistula should be taken.

Care should be had to ascertain at the time of the operation that the cause of the compression has been found and removed, and for this reason I believe it is best to explore the canal above and below the opening with a probe, being careful not to injure the dura. It may be best to remove more laminæ in some cases, in order that one may be

convinced that this end has been attained. In three cases—in one of Bridden's and in Demons' and in Kraske's—of Pott's disease, the compression was found at the autopsy to have been under other laminæ than those resected.

Chipault advocates the omission of a drainage-tube in every case where the dura has been opened, but I prefer even in these cases to drain away the considerable quantities of serous fluid that are exuded during the first few hours, placing a suture in position, however, to bring together the portions of the flap separated by the tube when it is removed. Deep and superficial sutures should be used in approximating the flaps.

In case a sinus occurs, or it is necessary to continue the use of the drainage-tube, and there is an escape of cerebro-spinal fluid, the skin about the orifice should be kept greased to prevent the contact of the escaping fluid, for it has been observed in every case where this fluid has drained away for any period it has caused excoriation of the skin.

In operating in the cervical region, particularly about or above the level of the fourth vertebra, care should be exercised not to puncture the cord. In Deaver's[1] case this precaution was not observed, and the patient died from inhibition of the phrenic nerve.

Eve[2] says that the operation, if not almost impracticable, is certainly one of the most difficult in surgery, but this is not borne out by present experience. The operation in itself is neither tedious nor difficult.

THE ETIOLOGY OF EMPYEMA IN CHILDREN:

AN EXPERIMENTAL AND CLINICAL STUDY.

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The first aspiration and exploratory puncture of the pleural cavity was performed by Bowditch, the American physiologist, and from this bold innovation upon the former methods in vogue may be traced our decided advances in the treatment and proper understanding clinically of the pathological conditions of the pleura. In his address before the Tenth International Medical Congress, Sir Joseph Lister in speaking upon empyema said: "There are few more beautiful things in antiseptic

[1] Internat. Journ. Med. Sci., Dec., 1888. [2] Ashhurst, Int. Ency. Surgery.

surgery, as contrasted with the results of former practice, than to see the abundant purulent contents of the pleural cavity give place at once to a serous effusion, rapidly diminishing from day to day." Surgery has therefore been in advance of pathology, and it was reserved to a very recent period for some enlightenment upon the nature of empyema and pleurisy to appear, and supplement the surgical advance in this department of medical learning.

This advance has been made through the avenues of modern bacteriological methods. I am certain that with the light thus thrown upon the nature of empyema in the adult, the diagnosis and understanding of this disease will have received incalculable aid, and the future treatment in both surgical and medical directions will be based upon more certain data than hitherto. I think we have passed that stage which justifies the general grouping of all suppurating pleural processes as empyema without modifying this term so as to point out at once the etiology. If the above is true of the adult, we would naturally expect the same phase of this question when applied to children. Though we have many of us taken for granted that what was true of the adult might be equally so of the infant and child, it has been the object of the author of this paper to make such an inquiry in exact channels, as had been done by others concerning the adult. The literature upon the etiology of empyema in the adult is not so very extensive, if we regard those works only which are really systematic, and therefore of satisfactory merit. The first complete contribution, an attempt to formulate the different varieties of empyema from a bacteriological standpoint, was that of A. Fränkel.[1] This paper contains the result of a series of studies extending back as far as 1886. The author divides empyema into the following groups:

Those in which the etiology is still a matter of speculation. In these we cannot point to anything positive, because both the clinical history and bacterioscopic examination of the purulent exudate give no support to any definite theory. In these cases the exudate upon examination fails to yield anything but a microörganism which is found in processes of diverse nature in the body. From the chain-coccus, or streptococcus pyogenes, we could with much justice presuppose an antecedent pneumonia; we might follow this chain-coccus in its migrations through the lymph-channels of the pulmonary pleura; but, on the other hand, there are authors who, like Fraentzel, believe in the occurrence of a "pleuritis acutissima." Unfortunately, this disease described by Fraentzel is of most rare occurrence and doubtful etiology. Traumatism or cold have been invoked in these cases as predisposing causes which allow such microörganisms as streptococci to act upon the economy by reducing its resistant vitality. We must here presuppose the continued presence of

[1] "Ueber die bakterioscopische Untersuchung eitrige Ergüsse," Charité Annalen, 1888, p. 147.

microörganisms in the subpleural tissue, even in subjects who clinically cannot be said to be suffering from any active disease. In the course of investigations upon empyema, the question has arisen whether an effusion into the pleural cavity might from the very onset be purulent; those of experience answer in the affirmative. In children especially we are apt to think that an effusion is serous, or rather non-purulent, if the exploratory needle gives what to the eye appears a clear, not turbid fluid. The inquiries into the pathology of these cases show that those acute cases showing a serous exudate which subsequently becomes purulent are really at the time purulent (from the beginning, in the most modern acceptation). To return to our first premise, though Weichselbaum has distinctly shown, in lobar and lobular pneumonia of the adult, that the streptococcus pyogenes and also the staphylococcus are present as so-called mixed infections, yet when we come to consider the exclusive presence in the exudate of empyema of these microörganisms there is a gap to be explained which, as far as we know, has not yet been clearly elucidated.

In another group of cases Fränkel found the exclusive presence of the pneumococcus or diplococcus pneumoniæ; this microörganism was found in pure culture in the exudate derived from the pleural cavity. The pus was of a thick, adhesive character, and the cases of this group are classed as post-pneumonic or concomitant with pneumonia (lobar pneumonia). Fränkel maintains that in these cases suppuration is maintained in the presence of a closed pleural cavity by the presence of bloodvessels with the existence of a different nutritive medium than in the artificial structures.

The third group of empyemas are those whose nature is tubercular. In all these cases he could not establish the presence of tubercle bacilli, for some baffled all the aids to diagnosis of this microörganism, both in plain stain, culture, and experiment. Fränkel has come to the conclusion that the absence of any result as far as stain and culture were concerned, in the study of exudates, pointed very strongly toward a tubercular element in the etiology of the empyema. Garré and Rosenbach in experimenting with the pus of cold abscesses had a similar result. Fränkel found tubercle bacilli by staining methods in only one case of four investigated; in the others the results were negative.

There is, according to this author, a fourth group of cases, in which we can find a focus of infection situated outside of the pleural cavity. He had two such cases, in both of which the chain-coccus was found, and one of which followed a perforating peritonitis, the other a retro-pharyngeal abscess. The conclusions of this author relating to empyemas are that the presence of the chain-coccus or streptococci, or staphylococcus pyogenes is not diagnostic. The presence of the diplococcus pneumoniæ points to a preceding pneumonia or complicating

pneumonia. An exudate which fails to yield any positive result either by stain or culture is in all probability tubercular.

Weichselbaum's name is also indissolubly connected with much good work in this field. He examined eleven cases of pleuritis.[1] Two of these cases were of a purulent and one of a sero-purulent nature, the remaining eight were serous. In the empyemas he found the streptococcus pneumoniæ, or what we may call streptococcus pyogenes, and in another case, which proved fatal, the diplococcus pneumoniæ was found. About this time, Fränkel published[2] two cases of empyema following pneumonia, in which he found the diplococcus pneumoniæ.

The above historical review would be incomplete without the mention of the important work of Ehrlich in the study of pleurisies.[3] He investigated by staining methods the bacterial character of fluids obtained from the pleural cavity in forty-five cases of pleurisy; of these, nine were tubercular, twenty simple pleurisy, six carcinomatous, and nine empyemas of various kinds. Of nine tubercular cases in which the sputa of the patients contained tubercle bacilli this microörganism was found in only two. The negative result in the remaining seven does not by any means prove the absence of tuberculosis of the pleura.

The work upon empyema in children is, in contrast to what has been recorded of the adult, limited to a few scattered notices in the literature. The most important is found in the work of Rosenbach, who examined the exudate of a case of empyema and found the micrococcus tenuis (pyogenes), or what is now thought might have been the diplococcus pneumoniæ, present.

The recent articles of Von Ziemssen ("Vorträge") and Liebermeister are simple literary *résumés* upon the subject.

Original Investigation.—My own work upon empyema was framed upon the lines outlined in the above review. An attempt was made to see how far the results in children, from a bacteriological standpoint, would correspond to those attained in the adult, or whether they would differ. In June of last year, I reported in brief my results in twelve cases; there are three additional cases to report, in one of which at least some interesting points will arise. The work done was upon material which at the time, for the most part, was in a hospital ward, evidently an advantage. The mode of bacterial study was in accord with what is practised by the Koch school of investigators. Some of my cases were taken from my dispensary class; others from private practice or those of my friends. It being established both

[1] "Ueber die Etiologie der acuten Lungen- und Rippenfellentzündungen," Medizin. Jahrbücher, 1886, Heft 8, p. 483.

[2] Zeitschr. für klin. Med., 1886.

[3] Beiträge zur Ætiologie pleurit. Ergüsse," Charité Annalen, 1882, p. 207.

from the clinical history and physical signs that there was a probable existence of empyema, the chest of the patient was carefully cleansed with soap and water, and then with sublimate; the excess of antiseptic fluid having been removed, a clean and sterilized hypodermic needle was introduced into the chest. To avoid contamination, a new syringe was used for each case, for it is very difficult to be certain as to the cleanliness of a syringe which has been once used for pus. The ordinary hypodermic syringe was used after being cleansed with sublimate, alcohol and ether, and then sterilized distilled water. The needle was sterilized with heat in the dry oven at a temperature of 160 to 170° C., kept in a sterile test-tube and only put upon the syringe at the last moment. A specimen of the contents of the pleural cavity once withdrawn was placed in an empty sterilized test-tube and taken as soon as possible to the laboratory and examined. The examination included not only the study of the gross specimen, the preparation of crude pus upon cover-glasses in the ordinary way, and then stainings of the crude pus, but plates and cultures were made upon media to establish the bacteriological character of the fluids withdrawn. The media used for culture experiments were bouillons, gelatin, glycerin agar, agar-agar, Weichselbaum's agar;[1] blood-serum and potato plates were first made to obtain colonies, as also test-tubes prepared by rubbing the fluid to be examined upon the obliquely solidified media, as agar (Weichselbaum); and pure cultures were also obtained from the plates, and if growth occurred in the tubes, plates were made to test the purity of the growths. Re-inoculations upon other media were made; when pure cultures were obtained, these were injected into animals for experiment. The animals used were rabbits, guinea-pigs, rats and mice. The most uniform results were attained from the rabbit experiments. The microörganisms were taken from a pure culture from an agar tube and suspended in sterilized distilled water, or, mostly, a pure bouillon culture was directly injected. The injections upon animals and autopsies were performed with the ordinary precautions followed in the bacteriological laboratory.

The characters of the crude pus withdrawn from the various cases are of interest when considered in relation to one series of cases, namely, those in which the diplococcus pneumoniæ of Fränkel and Weichselbaum was present. In some of this set of cases, the pus seemed of a rather glutinous adhesive nature; it would adhere to the sides of the test-tube when the same was inclined; this pus was either creamy-white in color, or greenish, or greenish-yellow. In these cases the chest was sometimes filled with enormous clots of fibrin, which were expelled from the opening

[1] By Weichselbaum's agar is meant the agar recommended by this author, containing 1½ per cent. of agar, peptone, and grape sugar, with ½ per cent. of salt.

made by resection of the rib. The pus also in some cases separated in a serous and opaque greenish layer upon standing; in other cases, as in greenish pus, the same had no adhesiveness. I mention these facts, because Fränkel has pointed out the adhesive or glutinous nature of the pus withdrawn from the adult cases, and the same characters in similar cases were easily established in children. In none was a fœtid odor perceptible, either in the pus derived from the cases in which the diplococcus pneumoniæ was present, or in those in which the streptococcus or staphylococcus pyogenes was found. Primarily, none in the series I have examined were fetid. In two cases the pus became fetid after the chest had been opened, and these cases, both of diverse nature, I will attempt to explain later. In all cases the crude pus was spread upon cover-glasses and stains made both for tubercle bacilli, diplococcus pneumoniæ, and other microörganisms; care was taken to follow out a routine in each case by which tubercle bacilli (Ehrlich's stain) could be excluded. In those cases in which the capsule cocci were found by simple stains with methyl or gentian-violet, the resistance to Gram's discolorization was tested.

For the sake of simplicity, we can formulate results in the following manner: In the pus of the fourteen recorded cases, I found the following microörganisms:

The streptococcus pyogenes.

The staphylococcus pyogenes aureus.

The diplococcus pneumoniæ (Fränkel and Weichselbaum).

The tubercle bacillus (Koch).

In few of the cases did I find these microörganisms associated, but usually existing alone in a specimen of pus. The tubercle bacilli were found associated with the streptococcus, as I shall later explain. It was certainly striking, at least in my series of cases, that the organism found existed in the fluid withdrawn from the chest in so-called pure state. The pus was really equivalent to a pure culture of one of the microorganisms. It would be tiresome and of little value to go into detailed description of the staphylococcus pyogenes aureus and streptococcus pyogenes found in my cases, and it will suffice to say that they are in culture media, and when injected experimentally acted in a way exactly corresponding to all that is known of these microörganisms.

The Diplococcus Pneumoniæ (Fränkel and Weichselbaum).—When the pus from an empyema is rubbed upon the surface of an obliquely solidified tube of agar-agar of Weichselbaum, and placed in a temperature of 35° to 37° C., there appears within about six hours a thin, almost imperceptible coating very much like dew on the surface of the agar; within twenty-four hours this is more marked, though it is still very delicate and veil-like, and does not seem to grow vigorously. In the depth of the agar, if the same has been inoculated, there is a delicate veil-

like reticulum. If such a surface culture be examined after successive re-inoculations, it is made up of very minute transparent punctate areas or colonies; as a whole, the growth does not attract the eye by any particular hue. If a puncture culture, as it is called, is made on agar, the area around the top of the puncture is very minute and scarcely perceptible. Colonies from pus sown upon agar-agar plates are at first so small as to be discovered only by the aid of a lens; they never attain a very large size, and are situated in the depth of the medium, and inoculated by means of the platinum point only with the greatest difficulty. The reason of this seems to be that the microörganism is so delicate that not enough adheres to the platinum tip to favor growth in the test-tube. The colonies after forty-eight hours are round, granular, with a darker centre, some of them, than periphery; they are of a transparent very light grayish tint or straw color by transmitted light; when the plate with colonies is held against a dark background, the reflected impression is that the colonies have a whitish tint. Unless this microörganism is transferred very early during the first few days to other tubes, it stops at a certain point and ceases growing—in other words, it may be lost. The colonies, especially in four or five days, begin to die out, becoming fainter to the lens and taking on the color more and more of the surrounding agar. The above applies to the diplococcus in pure culture derived from pleuritic fluid. After inoculation into animals, the growth, though the same in all essentials, seems to have attained a greater vigor, though even here, if not saved by repeated re-inoculations upon media, it dies out quickly.

Gelatin.—In gelatin, at the ordinary room temperature, there is no growth; at the temperature of 23° or 24° C. there is a very delicate growth which never becomes vigorous; along the puncture there is a granular minute beaded structure, but of the greatest delicacy, and the gelatin is not fluidified.

Blood-serum.—The growth here is much the same as on agar-agar of Weichselbaum, though the colonies making up the surface culture may be said to be more grayish in tint, or slightly more perceptible than upon the agar.

Bouillon.—Here there is first a general clouding of the medium, and then a deposit of flocculi along the sides of the tube, and finally a small deposit in the bottom of the test-tube, leaving the fluid or bouillon above finally clear. When shaken, there is great turbidity and abundance of fine flocculi.

Potato.—There is here no perceptible growth.

Ordinary agar.—It is certainly a waste of energy to attempt to cultivate the diplococcus successfully upon ordinary agar, for failure will be the most frequent reward. In other words, much valuable time has

been wasted by others as by myself in making such attempts. The least variation in moisture or reaction will compromise the growth, so that I have worked mostly with the agar-agar of Weichselbaum, rather than with that made up by the old formula.

Glycerin agar—six per cent. to eight per cent.—did not seem to present any advantages. The growth was very slow and difficult of re-inoculation, and capricious.

Stainings.—The crude pus shows us the diplococcus with its capsule. I have had no difficulty in establishing the presence of the capsule coccus by means of the simple methyl-violet or gentian-violet and aniline water stain, taking care not to over-stain. If the specimen should have been over-stained, it can be easily decolorized (but this very lightly) with dilute alcohol. The pure culture shows the diplococcus from agar very beautifully, as oval or round diplococcus forms of apparently the size seen in the crude specimen without any capsule; the diplococci may be single or in chains of two or three pairs. By the Gram stain there are also seen both in the crude pus and crude culture some of the peculiar lancet-shaped forms; while I could find here and there a beautiful lancet form, there were many which upon analysis appeared peculiarly crenated, perhaps due to either unequal decolorization or overheating. The capsules in the crude specimens are decolorized by the Gram method, though the light decolorized zone of their presence may be seen by strong and favorable illumination in some cases.

The Staphylococcus Pyogenes Aureus which was met in these empyema cases could in no way be distinguished from the staphylococcus which I separated and cultivated for comparison from the ordinary furuncle of the skin. It reacted in the same manner in the various culture media. In the gelatin it grew at the ordinary room temperature along the puncture and had the same yellow-gray or straw-color beaded look. The gelatin, after the third or fourth day, became liquefied; this began at the top and proceeded along the puncture in length and breadth. After a time the liquefied gelatin showed the finely granular suspended colonies, and the sediment at the bottom of the liquefied gelatin took on the same orange-yellow color.

Agar-agar.—Upon obliquely solidified agar there was at a raised temperature a very vigorous growth on the surface, and in the depth, which, at first whitish-yellow, after a time assumed a rich orange-yellow tint; the surface of the growth was moist, and its edges sinuous and raised very perceptibly above the surface.

Potato.—The well-known orange-yellow moist growth was perceptible within twenty-four hours, increasing in vigor and luxuriance; it was at first golden-yellow, then deeper orange-yellow, having the peculiar odor of the ordinary culture of staphylococcus.

The Streptococcus which I have isolated from cases of empyema

reacts in media exactly similarly to the ordinary streptococcus pyogenes. In agar-agar plates the colonies remain small but some large, some irregularly round, others oval of a brownish-olive tint and granular appearance. In punctures the finely beaded dots and zone surrounding the top of the puncture exhibit no tendency to spread to any extent; on the surface of obliquely solidified agar a pearly-gray growth is seen (Weichselbaum's agar) made up of drop-like masses in the depth; the same beaded appearance in either a band or puncture that is seen in ordinary agar.

Gelatin.—Small finely granular colonies, at first straw-tint and sharply round, later more brownish with an olive tendency. At border, through gelatin, they appear straw-color, on surface of gelatin they have a distinct cupola (raised); they grow in depths also. In punctures, finely granular, no liquefaction of gelatin.

Bouillon.—In twenty-four hours we have a cloudy appearance, and deposit of masses on sides of test-tube, finely granular in the centre. Stainings show exquisite chains.

Potato.—Nothing characteristic or perceptible.

EXPERIMENTAL.—The experimental part of my work was laid out upon very simple lines, and is intended merely to add confirmatory evidence upon the nature of the microörganisms which I have isolated from the various cases of empyema reported. The results attained, it will be seen, are almost identical with those obtained by other observers (Fränkel and Weichselbaum).

My method consisted first, in isolating microörganisms so as to obtain a pure culture of each variety, and then injecting this pure culture into the animal to be experimented upon. The animals used were mostly rabbits, but a few scattering experiments were performed with guinea-pigs, rats, and mice. The injections were made with sterilized hypodermic needles underneath the skin and into the pleural cavity or lung. There were no inhalation experiments. A pure culture of any microorganism having been injected into the animal, the same was observed, and if the animal survived, it was, after a sufficient period had elapsed, killed and pathological effects noted. If the animal died from the effects, the blood, and the pleuritic, pericardial and peritoneal fluids were examined, and the nature of the contained microörganisms established in exactly the same manner as had been done with the original pus obtained from the empyema. Re-injections of these pure cultures from animals were made, as also injection of pleuritic and peritoneal fluids from animal to animal. Pus in crude state from empyemas was also injected into animals, and the microörganisms cultivated from the blood and fluids of such animals.

The most interesting series of experiments in their results were those performed with the pure cultures of the diplococcus pneumoniæ. In every case the isolated microörganism was injected into a set of animals,

and the results have been noted. After the first effects of the injection had passed off (chest injections into pleura), the animal in some cases seemed to be as well as ever, but after a few days, varying in different cases, the animals in most cases died. Death was, as a rule, preceded by a short period of dyspnœa, or again the animals may have appeared ill through the whole experimental life. The autopsies revealed in most cases pleurisy single or double, even though injection was made into one side of the chest. The lungs in no case were the seat of complete hepatization (pneumonia) lobar in distribution; but in rabbits 1, 3, 6, 9, and 11 there was a condition of the lung not dissimilar to an engorgement in areas to smaller or greater extent. In rabbit 6 this approached closest the type of hepatization in the upper lobe of the left lung. Pericarditis was present in most and also very marked peritonitis. Care was in all cases exerted to inject the fluid containing the microörganism just beneath the rib into the pleural space, though it was often impossible to say that it had not penetrated the lung; at least care was taken that it should not do so.

In most of the cases the spleen was enlarged to palpably twice or thrice its original size. Cultures made of the blood and pleuritic or pericardial fluids of such animals also yielded a uniformly certain growth of a diplococcus which in every way and reaction corresponded to the diplococcus pneumoniæ of Fränkel and Weichselbaum. Its growth was at first quite vigorous on the Weichselbaum agar, but it died out and was soon lost if not re-inoculated, just as the original pure culture obtained from the empyema pus. Animals injected with the pleuritic or peritoneal fluid of other animals that had died of injection of pneumococcus also died certainly and even rapidly. The lung and spleen fluids (obtained by expression) with cover-glass stain also showed myriads of these diplococci. By the injection of pure cultures of diplococcus underneath the skin, the results were not so certain, though in some the animals died with the above features. The pus from empyemas known to contain nothing but diplococcus pneumoniæ also killed the animals with unfailing certainty; cultures made from these animals revealed the diplococcus only, and injections of peritoneal fluids from these animals into others proved fatal with results showing pneumonia, pleuritis, pericarditis, and peritonitis, and in all the fluids of such animals, inclusive of the blood, the diplococcus was found. In some cases the animals would seem to have had vitality enough to have resisted this organism, and completely recovered from the effects of their injections and consequent inflammatory disturbances. Such animals were killed after a sufficient period had elapsed, and in most cases there could be seen adhesions of the pulmonary to the costal pleura, and adhesions of the pericardial surfaces. Some guinea-pigs injected gave results much the same as those seen in rabbits. In other cases the

animals seemed to have successfully resisted the effects of the micro-organisms, for upon autopsy nothing was revealed that could be traced to any pathological process.

Experiments with the streptococcus which was isolated from the pus of the empyemas recorded in this paper, and which appears to be identical with the streptococcus pyogenes, though positive in some features were yet not so distinctive. The results seemed to vary, for while in some cases streptococci did not prove fatal, in another the effects seemed most virulent and rapidly lethal. In some, injection of streptococci into rabbits had no effect, the animals survived, and being killed after weeks had elapsed, absolutely nothing abnormal was found. In other cases streptococci (from the same empyema) caused marked disturbances; the animal appeared quite ill, but recovered and was for weeks apparently in good health; when killed, a few pleuritic adhesions only were found.

In other cases, an injection of a pure bouillon culture of streptococci, notably in rabbit 15, taken from Case XI., caused the death of the animal in two days, and autopsy revealed nothing but an enormous spleen (the largest I have seen in my experiments) with kidneys palpably swollen; cultures of the blood revealed streptococci. Thus, in this case, we have the symptoms of a pure septic effect, a septicæmia without inflammatory lesions. Again, this same bouillon culture, which was pure in every way and repeatedly tested as to purity by plate methods, was injected at the same time into another animal in the same amounts, though not in the same manner, and there resulted the unusually virulent effects seen in rabbit 16, in which small metastatic abscesses appeared in different organs of the body, and general jaundice. The spleen also was notably enlarged. The results, though corresponding in certain ways, do not give anything not characteristic of streptococci isolated from other inflammatory processes in the body, and the experiments upon rabbits 15 and 16 agree closely with what is recorded of experiments made with streptococci pyogenes isolated from cases of pyæmia, and notably that of the kind recorded by Baumgarten.

I did not make any experiments with staphylococci isolated in my cases, the reactions of the microörganisms being so familiar in every laboratory. It appeared to me sufficient to establish its biological identity.

The experiments with the pus obtained from the cases of tuberculous empyema were negative. The pus was contaminated at first with streptococcus pyogenes and later with putrefactive microörganisms, and this clouded the reliability of the experiments. Injections into the eyes and pleuræ of animals gave no results that were of scientific value.

(To be continued.)

THE TREATMENT OF ERYSIPELAS.

A PERSONAL EXPERIENCE IN FIFTY CASES.

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I HAVE prepared for consideration four series of tabulated cases: No. 1 being the cases admitted to Charity Hospital in 1888; No. 2, those in 1889; No. 3, those received up to June 1, 1890; and No. 4, the cases treated by myself outside the hospital. For the opportunity of observing cases in the wards, and for the privilege of publishing them, I am indebted to my colleagues of the surgical staff of the hospital.

The cases in the hospital tables for the two and a half years number 419, and my own cases since January 1, 1889, 47; making a total of 466 cases available for study.

While not bearing directly upon the question of treatment, I may be pardoned if I speak of some points made prominent in the tables before me. Thus of the 300 cases which were received at the hospital during 1888–89, the greater number by far occurred in the winter and spring months, as follows:

December	18	June	13
January	28	July	4
February	49	August	8
March	37	September	12
April	64	October	11
May	47	November	9
Total	243	As against	57

There is no doubt that more patients seek hospital treatment during the cold and damp seasons than during the pleasant months; still, there must be something beside this fact to account for the marked increase of the one over the other season, because the same thing is found in private practice, though in a less marked degree. My experience in town practice corresponds, in a great measure, with the showing of the hospital tables, and I find that the number of cases by months was as follows:

December	2	June	6
January	7	July	0
February	9	August	2
March	5	September	1
April	3	October	2
May	8	November	2
Total	34	As against	13

This demonstration of the greater prevalence of erysipelas in New York during the cold and moist seasons of the year agrees with the results obtained by the majority of investigators who have given attention to the subject in other countries. Carl Haller's statistics, based upon ten years' study of erysipelas at the Vienna Hospital, show the greatest number of cases in April, May, October, and November. Kaposi's observations, carried out over a period of two years and published in 1887, show the largest numbers in March, May, November, and December of one year, and January, February, April, May, and December of the other.

To quote a recent observer, Linden, of Finland, whose study of the question extended over a period of eight years and embraced over 5000 cases, found 27.1 per cent. in the winter, and 20.4 per cent. in the summer months for Stockholm, and 29.2 per cent. in winter with only 18.8 per cent. in summer for Helsingsfors: an appreciable difference, though not so marked as that shown in the Charity Hospital record.

The most plausible explanation seems to be the sudden and decided variations in the temperature and moisture of the atmosphere in these seasons, but whether these factors influence the outbreak of the disease by weakening the patient's powers of resistance to the erysipelas coccus or by favoring an increased production or increased activity of the microörganisms outside of the human body is a question which must remain for future solution.

The relative frequency of facial erysipelas is another point made prominent in my tables. Thus of the 419 cases at Charity Hospital 267 were of the facial variety, or 63.7 per cent.

It is quite remarkable to note that of the 531 cases in Kaposi's statistics 336 were facial, or 63.27 per cent., almost an identical percentage.

The table of my personal cases shows, out of a total of 47 cases, 24 instances of facial erysipelas, or about 50 per cent. Of these 18 were so-called genuine facial cases, and 4 were consecutive to trauma or skin disease. Erysipelas of the extremities gives 23 cases, 19 of which followed trauma or skin lesions. There were no deaths from the facial erysipelas, and only 3 from other forms, or 6.4 per cent. The deaths all occurred in infants; one at five months following varicella, and the two others at three weeks of age respectively, both the result of ritual circumcision done in a bungling manner. Forty-two cases were cured after an average length of treatment or duration of the erysipelatous process of 7.57 days. Two cases passed from observation.

The tables of the Charity Hospital cases show 21 deaths, or 5 per cent., and in the 267 instances of facial erysipelas, 10 deaths, or 3.7 per cent. The average stay in hospital for 56 cases in 1888 was 21 days; for 190 cases in 1889 was 24.3 days; for 116 cases in 1890 was 20.4 days, or

a general average of 22 days. Having digressed to this extent, I will now briefly outline the various methods of treatment which I have employed, first, however, giving the course of treatment which has been applied in the Charity Hospital cases.

1. In idiopathic facial erysipelas, as well as in non-traumatic cases elsewhere located, a paint having the following composition is applied over the affected region:

R.—Tinct. benzoin. comp.	℥ij.
Collodion flex.	℥j.
Glycerin.	℥j.

Occasionally, acid. salicylic. ℈i has been added to the above. Internally, the tincture of the chloride of iron, 20 minims three times daily, is given in a routine manner to nearly all cases.

2. In consecutive cases, *i. e.*, of traumatic origin, where the inflammation is not deep-seated and there is not much tension, this protective and antiseptic paint is likewise employed, and a bichloride solution 1 : 5000 or 1 : 6000 is applied hot to the wound or raw surface. Iron is given as above in these cases.

3. In cases where there is much tension and the integument has been broken by bullæ or otherwise, hot bichloride 1 : 6000 is applied and several coats of the paint are used as a limiting strip above the affected part if upon the extremity, or surrounding it if practicable. The same dose of iron is likewise given in these cases.

The tables show that quinine enters largely into the treatment of the hospital cases, especially those in which a high temperature is present. Other drugs mentioned as being occasionally employed are calomel, digitalis, aconite, belladonna, antifebrin, antipyrine, and bromide for the delirium.

At times the above line of treatment has been deviated from by the trial of spirits of turpentine internally instead of iron, in dose of 10 drops three times daily. This appeared to do as well as the iron in some cases until about the third or fourth day of treatment, when it ceased to be tolerated by the stomach. Occasionally, too, iron has been omitted because it was thought to disagree in some way with the patient, but, as I have said, in the great majority of cases it was given as a matter of course.

Baths of a 2 per cent. solution of creolin have been tried, but without good results. Injections of iodoform in solution have been practised in some cases about the margin of patches with the idea of limiting the progress of the erysipelas, but no appreciable benefit has followed. Tincture of iodine used with the same object in view has resulted not more favorably.

Although my belief is that erysipelas is a disease of more or less

definite course, tending, when uncomplicated, to terminate favorably—excepting in the very young, when death almost invariably results—still I believe that by judicious treatment this course can be very materially lessened and in some cases brought to an abrupt termination; and for this reason I cannot agree with those who put faith in no treatment at all, and argue that because erysipelas is one of the diseases in which so great a number of diverse drugs and methods have been advocated, that none is good; nor yet can I accept the dictum of those who take a *laisser aller* view of the matter, thinking that the cases will do well enough if left to themselves.

Since Fehleisen's discovery of the streptococcus erysipelatus and the demonstrations of Hueter and others, which go to show that it is truly an infectious disease in all probability due to the presence and multiplication in the skin and subcutaneous tissues of a micrococcus, methods of treatment have in a measure changed, and the therapy of to-day is based largely upon antiseptic, anti-bacterial, mechanical and surgical procedures.

I presume that all have accepted Fehleisen's experiments with pure cultures in 1882 and the subsequent investigations of others as showing the contagious nature of the disease, and I believe that the future treatment of erysipelas must, in a measure at least, conform to bacteriological findings. Thus it has been found that the streptococcus grows more rapidly in parts well supplied with oxygen, and nothing seems to me more rational than to endeavor in treatment to shut off this supply so far as possible.

In twenty-two of my cases I have endeavored to accomplish this purpose by the application of an occlusive dressing having collodion as a base. In nineteen of them I have incorporated with the collodion ichthyol, and in three cases aristol. In four instances I have employed white-lead paint, as recommended by Lewis for the same purpose; in two I have used an ichthyol ointment; in two a resorcin ointment; in five a strong solution of permanganate of potassium; in seven a solution of the hyposulphite of sodium; in one case a bichloride solution; in one lead and opium; in one a saturated solution of boric acid; and in one the application of the tincture of the chloride of iron. In two instances I have performed scarification, and in two others have applied a tight adhesive strip above the affected area upon an extremity.

I will take up the more interesting cases one by one and speak of the treatment, and its effects as we proceed. First for the "genuine" facial cases.

Case I.—Female, aged eighteen years. Erysipelas of face, involving first one side and spreading to the other, with formation of large bullæ.

Treatment.—Internal: Tr. ferri chlor. ♏xx every three hours. External: The same locally applied.

Result.—Recovery at end of ten days. The application of iron is not an agreeable dressing, and as it appeared to do no good I have not since tried it.

Case II.—Female, aged forty-five years. Erysipelas involving whole face and subsequently the scalp.

Treatment.—White-lead paint to cover the whole face. When extension took place to the scalp the hair was cut short and the whole scalp painted. The general symptoms were very severe, and convalescence was not established until the twenty-third day. The paint was removed slowly and with difficulty from the scalp, and I would not advise its application to hairy parts.

In this case the use of the paint did not make a very favorable impression upon me, though the patient and friends appeared well enough satisfied with the result.

Case III.—Male, aged thirty-four years. Erysipelas of one side of face. White-lead paint. Improvement till seventh day, when extension took place to opposite side of face and patient entered hospital. I saw patient about a week later, when recovery had taken place.

Case IV.—Male, aged fifty-eight years. Treated with a very weak solution of hyposulphite of soda (℥ij to Oj) and internal symptomatic remedies (antipyrine, bromide). He was convalescent on the eighth day.

Case VI.—Male, aged fifty years. Erysipelas of face. The same external treatment and iron internally (gtt. x every hour part of the time). The scalp became involved and the disease ran its course in fifteen days. Decided alopecia followed.

Case VII.—Male, aged fifty-three years. Erysipelas began simultaneously in both ears and extended to the right side of the face. Same external applications. Although extension to cheeks, forehead, and scalp occurred, and large bullæ formed, after seven days the patient was practically well.

Case VIII.—Female, aged forty-five years. Had previously suffered from erysipelas of face seventeen years before. Present attack began after exposure to cold and wet. After two days of hyposulphite solution locally, iron was given internally. On the seventh day desquamation had begun, there was no longer any fever, and convalescence was rapid.

Case X.—Female, aged thirty-seven years. Whole face involved and great headache, not relieved by a drachm of antipyrine in divided doses. Great delirium at night. Here I used resorcin ointment in strength of ℥j to ℥j for the face, and a wash of ℥j to Oj for the scalp. Convalescence after eighth day, when wine and iron were given. The daughter of this patient had been a daily visitor at the house of Case VI., often being in patient's room during his illness, and probably in some unknown way brought the cocci home to her mother.

Case XIX.—Male, aged eleven years. Erysipelas began at back of neck and extended over scalp. A younger brother of this patient was sick in the same room with migratory erysipelas of the body and extremities (Case XVIII. of table).

Treatment.—Ichthyol ointment ℥ij to ℥j. In three days the boy was entirely well.

Case XXIX.—Female, aged forty-four years. Erysipelas of a week's duration, starting from a lachrymal fistula. Involvement of both cheeks and ears and severe general symptoms.

Treatment.—Ichthyol ointment, ʒij to ℥j. Antipyrine and whiskey internally.

Result.—Erysipelas at a standstill in two days. Recurrence after four days which lasted for five days, after which patient remained well.

Case XXX.—Male, aged twenty-three years. Patient has rosacea. The day before my visit erysipelas had begun upon the left cheek. I painted the area over with a solution of permanganate of potassium, gr. xx. to ℥j. This had the effect of aborting the process within two or three days. Some three days later, however, the opposite cheek became affected, and under the same external treatment was well in four days without having spread to scalp or ear.

Case XXXI.—Male, aged twenty-three years, son of Case No. VIII., which I attended in the same room one year ago. Three days before my visit there had been a decided chill, followed on the next day by a bright-red spot upon the bridge of the nose. There had been no injury or preceding lesion upon the face. When I saw the patient both cheeks, the lower eyelids, and the middle of the forehead half way to the margin of the hair were involved, and extension to the upper lids was just beginning. On the left side the redness extended quite to the ear, while on the right there was an inch and a half of apparently unaffected skin intervening. The usual general symptoms were present. This appeared to me a most suitable case for treatment by scarification. Securing the patient's consent, I placed a circle of criss-cross cuts about the patch upon the forehead midway between its margin and the hair line, extending them down over the side of the forehead and between the border of the erysipelas on the cheek and the right ear. As the disease had already reached as far as the left ear, no cuts were made on this side. I also laid a series of quadrilateral cuts just at the lower margin of the patch on a line with the angle of the mouth upon the right side, the cuts being made equally in the diseased and sound skin, according to the Riedel method, not over half to three-quarters of an inch in length, but quite close together.

Permanganate of potassium, gr. xxx to ℥j, was now applied over the whole surface, including the scarified portion. By the following day the disease had spread beyond the barrier, for about an inch upon the forehead, slightly beyond it on the right side as far as the ear, and not at all in a downward direction either upon the scarified or non-scarified side. Neither ear as yet involved. Bullæ over cheeks and forehead. Redness and swelling diminished in region of nose and lower lids. The following day both ears swelled and were included in the painting with permanganate. Two days later there was no pain or tenderness, the face appeared well, appetite good, tongue clearing, bowels regular. The next day the permanganate-blackened crusts were peeling off, and patient regarded himself as well and I so regarded him. No internal treatment had been used.

Case XXXII.—Female, aged thirty-two years. (Wife of Case XXIV., who had twelve days before recovered from an erysipelas of the leg and thigh.) Chill on February 7th, erysipelas beginning in centre of left cheek February 8th and extending by February 11th to the whole face, causing closure of both eyes and almost occluding the nares.

Treatment.—Internally. Whiskey and antipyrine; locally, permanganate of potassium, gr. xxx to ℥j.

On the 26th the erysipelas was well, after having extended over the entire scalp.

CASE XXXIV.—Female, aged twenty years. Patient has had two previous attacks; last one a year ago in same room. First seen March 26th, with history pointing to primary erysipelas of the larynx two weeks before. Aphonia still present.

The skin erysipelas began three days previously upon the bridge of the nose, and now involves the whole face and scalp. Eyes cannot be opened, delirium pronounced. Temperature 104° +. Had been treated. Ordered hair cut short, ice-bag to scalp, stimulants at frequent intervals, antipyrine to reduce the temperature. Locally, ichthyol collodion ʒij to ℥j (ichthyol ʒij, ether ʒj, collodion ℥j).

Next day, February 27th, great improvement. Menses occurred. No headache or delirium, less fever. Eyes can be slightly opened. Scalp covered with a 1 : 3000 bichloride wash. Iron internally. Four days later bullæ on face and scalp had dried into crusts and patient was up.

A month later patient came to me with a stye on the right upper lid, and six days later with a second one, and upon the cheek below was an erythematous spot strongly suggestive of a return of the erysipelas. I incised the styes, washed out with a bichloride solution, and prescribed a zinc oxide ointment for the erythematous blush, under which it entirely disappeared. Three days later, however, a bright-red, tender spot appeared just in front of the ear and upon the cheek on the left side. I now ordered to be applied twice daily a solution of permanganate, gr. xxx to ℥j. By the following day the whole face was again covered by erysipelas and the eyes closed by swelling. There was some pain from the strong permanganate, so I substituted a 1 : 1000 solution of same to be applied hot. Three days later patient was up, the face free from swelling and beginning to desquamate. Patient remained well for three days, when a recurrence took place in one cheek. Ichthyol ʒj to water ℥j was applied, and iron was given in 15-drop doses every three hours. In two days symptoms were all absent, and no further recurrence took place.

CASE XXXV. occurred in a German woman, aged sixty-eight years, who had a hemiplegia of six years' standing, and was otherwise debilitated. Whole face and scalp were affected and there were severe general symptoms. Low muttering delirium day and night; dry, glazed tongue, sordes, etc.

Locally, permanganate gr. x to ℥j, abundant supply of alcohol, and iron ♏xx every three hours.

Thirteen days later patient was up attending to household duties. Fifteen days subsequent to this date a recurrence took place, but under the same treatment she was entirely well in four days.

CASE XXXIX.—A pregnant woman, aged thirty-seven years, had four weeks previously recovered from an erysipelas of the face treated with lead and opium wash, under the care of another physician. I saw patient the day after a recurrence had taken place, and ordered ichthyol collodion and iron ♏xv every two hours. Case terminated favorably six days later.

CASE XL.—Female, aged twenty-five years. Erysipelas of whole upper portion of face, and eyes nearly closed. Treatment by ichthyol collodion ʒj to ℥j. Cure in three days.

CASE XLIII.—Female, aged seventeen years. Patient had just recovered from a tonsillitis. Erysipelas of left cheek, treated with ichthyol collodion and entirely well in three days, without extending.

Six other cases of facial erysipelas were subsequent to trauma or skin diseases, but presented all the features of the other cases. One started in an unhealed varicella pustule upon the ear of a girl of seven years and spread to the face and scalp. It was treated with ichthyol collodion and was well in five days. Another developed upon a scalp the seat of an impetigo, and was well under the same treatment in four days.

CASE XLI.—Female, aged twenty-three years. Six days after a scalp wound, in which several stitches were taken, erysipelas began upon the opposite side of the scalp at some distance from the wound and extended down over the forehead and cheek. I cleansed the wound, which was still discharging pus, and dressed it with aristol powder. To the erysipelas of the scalp I applied a 10 per cent. solution of ichthyol in water, and to the face ichthyol in collodion. In eight days patient was entirely well and wound had healed. At no time had there been any evidence of erysipelas very near the wound, although both sides of the face became affected.

CASE XLIV.—Female, aged sixty years, who had the most extensive gummous ulceration of the entire scalp which I have ever seen. There was an open ulcer the size of a half-dollar just within the hair line, and it was undoubtedly through this that inoculation took place. The whole face and both ears participated in the erysipelatous process, but the scalp remained free.

Treatment.—Solution of aristol in collodion, 5 per cent., and aristol powder freely applied to the open ulcers upon the scalp. The erysipelas was well upon the eighth day, when I made my last visit.

This case of neglected and untreated syphilis subsequently showed most rapid improvement under antisyphilitic remedies, with aristol applied locally to the ulcers.

CASE XVII.—Female, aged twenty-six years. Erysipelas of hand and arm. The special interest in the case is that the patient is the subject of marked elephantiasis of the legs, the right being much enlarged. Until this attack, it was not known that the upper extremity was affected with elephantiasis as I subsequently found it to be. There have been two previous attacks of erysipelas of the legs. I saw patient the day after erysipelas had begun in the hand, and painted the hand and arm with white-lead paint, and ordered some anodyne and antipyretic remedies. The heat and pain were so great in the night that the paint was removed and ice-cold cloths applied by the advice of another. These proved so soothing that the patient placed her hand upon the cake of ice which was kept at the bedside to cool the cloths, and went to sleep. At my next visit the fingers were icy cold, insensible, and presented a bluish, frozen appearance. I refused to give patient further advice excepting that she enter the hospital. This she did, and there had removed the distal phalanges of three fingers and the thumb.

CASE XXXVI. refers to this same patient. About a year after the unfortunate occurrence above narrated, I was called to attend her for an erysipelas of the left leg and foot, which had begun two days before in

the region of the knee and had rapidly extended to the foot. The leg appeared enormously enlarged in consequence of the elephantiasis from which she suffered. I at once painted the whole area with ichthyol ʒij, ether ʒj, collodion ℥j, and gave internally:

℞.—Quin. sulph. . . . . ʒss.
Tinct. fer. chlor. . . . . ʒij.
Aq. dest. . . . . ad ℥ij.—M.
S.—One drachm every two hours.

In four days the patient was well and out of bed.

These attacks of erysipelas in elephantiasis have not been looked upon by some dermatologists as identical with the true erysipelas, but rather regarded as a species of lymphangitis. I must say, however, that I cannot take this view of the case in point. The appearances and symptoms entirely resembled those of other cases of erysipelas of the extremities, and I never saw a more typical instance of the disease than that presented by this patient's hand and arm the year before. There was in the case of the hand, as in that of the leg, marked striæ and cords of lymphangitic inflammation extending to the glands in the axilla and groin, attended with great tenderness and pain; but the same thing is often observed in ordinary erysipelas of the extremities without elephantiasis. This was true of Case XXIV. An erysipelas of the leg in a man aged forty-five years, not attributable to trauma, was attended with very decided lymphatic involvement causing painful red cords to extend from the patch to the groin, where the glands became very greatly enlarged. The usual ichthyol paint was applied over the whole extent of inflamed tissue in this case as well, and the iron and quinine mixture above mentioned was given internally. Patient was well in six days, though gland in groin remained tender for some days afterward.

As illustrating in a graphic manner the identity of this form of erysipelas and genuine facial erysipelas, the wife of this patient, who had carefully nursed him during his illness, was taken down with facial erysipelas twelve days after the latter's recovery, and hers is Case No. XXXII. of the present report and has already been referred to under the non-traumatic series of cases. One case developed from vaccination in a child of ten months, and four started in a varicella lesion.

One of these (Case XXVIII.), in a five-months' girl baby, proved fatal on the thirteenth day of the disease and five days after I first saw it. This was one of the cases in which I employed scarification. The erysipelas, which had begun in a varicella pustule upon the leg eight days before, had now extended up the back to the shoulders, over the thorax in front, to the ankle on the left side, and to below the knee on the right. The prognosis was most unfavorable, but I thought scarification offered a chance of checking the upward spreading. I made crossed incisions deep enough to draw blood about an inch above the margin of disease, according to Lauenstein's method, entirely surrounding the

chest. On the right leg I made the incisions just in the border, extending equally into the patch and the healthy skin. On the opposite leg the same was done just above the ankle. The whole was then washed with a bichloride solution 1 : 1000, and this was also used as a dressing for the whole affected area. By the following day the margin of redness had extended slightly beyond the scarification upon both legs. On the right side of the chest it had gone about half an inch beyond both behind and in front, but on the left side the erysipelas had stopped exactly at the boundary line. General appearance of child improved. Brandy in frequent doses.

On the following day child began to cough and was very restless and weak, with faint moaning cry. Left leg and genital region much swollen and œdematous. No further extension beyond the scarified barriers excepting upon the right side of thorax, where the pink line has advanced about half an inch. The physician who had attended the child during the first days of its illness now again took charge of the case, which terminated fatally three days later.

Case XXVII.—Brother of last case, aged one and a half years. Varicella had begun at same time fourteen days before, and erysipelas had shown itself coincidentally in both children eight days before I saw them. Here the dorsum of the foot was first affected in the neighborhood of a varicella lesion. Great prostration, complete anorexia, very weak pulse. Treatment up to this time had been iron internally and cold-water dressings. Ordered iron continued and brandy in frequent doses. Milk, etc. The affected areas and healthy skin beyond were thickly covered with ichthyol collodion.

Next day, no extension, slight improvement in general symptoms. Following day, extension to scrotum and pubic region, with great swelling. Ichthyol continued to the whole.

For three days both cases were in care of another physician. I now resumed charge and continued the ichthyol locally to leg, scrotum, and penis, which were enormously enlarged. One week later the boy was convalescent.

Case XXXVIII.—Male, aged four months. Erysipelas of right leg and thigh, beginning in a varicella pock and rapidly extending. Patient had lived till recently with the grandmother, whom I had treated the preceeding year for a severe erysipelas of the face (Case No. II.).

Treatment.—Ichthyol collodion, and internally iron, quinine, and brandy.

Following day, extension to groin. Fifth day, patient well.

Case XX.—Male, aged three weeks. Erysipelas migrans gradually extending over the whole body, the head alone escaping. Disease began upon the genitals about a week after circumcision so badly done that the skin had been removed from the whole under surface of the penis down to the peno-scrotal junction. In this case the erysipelas wandered for a second time over regions where recovery had apparently taken place. Finally, the day before death the bullæ became hemorrhagic, œdema of the skin in the region of the throat occurred, the breathing became much oppressed and the child sank rapidly.

Treatment had consisted in ichthyol collodion and ichthyol ointment to the wound upon the penis.

Case XLVI.—Male infant aged three weeks. This child had been circumcised upon the eighth day, and when I saw him presented an

extensive triangular wound left by the moël, who had removed the frænum and a large portion of the skin from the under surface of the penis just as in the preceding case.

Seven days later and two days before my visit a redness and swelling had appeared in the left groin. This was regarded by the physician who first saw the case as a beginning bubo. By the time of my examination, however, the erythema had extended to the scrotum, pubic region, and the inner and posterior surface of the thigh. Up to this time lead and opium wash had been employed without apparent benefit. Prognosis extremely unfavorable.

Having had what appeared to be a very favorable result from aristol in a case already related, I painted the whole surface over with a 5 per cent. solution in collodion of this new preparation, extending it beyond the margins of the disease. I also applied aristol powder to the wound. Internally, brandy.

Extension by next day to middle of back and over buttocks, downward to upper third of right thigh and to middle of left, entirely surrounding both limbs. I did not see child again, but was notified by the physician in charge that it died some three days later.

Another case in which aristol was used with good results is Case XLV., first seen on June 11th, one day after an erysipelas had shown itself near a lesion of ecthyma upon the leg of a boy aged nineteen months. At that time it extended from the middle of the thigh to the ankle. I applied a tight adhesive strip of plaster above the patch, as well as about the ankle below it, and painted the intervening space with a 5 per cent. aristol collodion. Brandy internally. The following day large bullæ had formed beneath the plaster bands and an erythematous blush extended for a slight distance beyond. The adhesive strips were removed and the whole surface was again painted with aristol collodion. Two days later erysipelas had extended above the rim of the pelvis. I now applied ichthyol ʒj to ℥j of collodion, as I could not obtain aristol. Extension next day to middle of back. Aristol collodion was now used again, and no further extension took place; the bullæ dried into crusts, and improvement rapidly followed.

The last case is in some ways the most satisfactory. It occurred on August 7th of the present year in the person of a three-year-old boy at a seaside hotel. Following a chill and high fever, erysipelas began simultaneously at both legs at about an inch distant from a pustule of unknown nature situated upon the anterior portion of either shin. When I examined the child I found a patch upon the left leg two inches in width almost surrounding the limb, and upon the opposite side a smaller patch. I at once bound up both legs in a solution of hyposulphite of soda in strength of ʒj to ℥j. Temperature was then 103½° F. The same evening, in consultation with the family physician, Dr. Stub, of Brooklyn, a solution of iodine in collodion gr. x to ℥j was applied to the patches and about an inch beyond them. Later in the night the rectal temperature was 107° and there were some convulsive movements and delirium. Antifebrin gr. v. was now given with whiskey and repeated every three hours. Several slight chills occurred and there was extension of the process about an inch beyond the painted margin on the left side.

The following morning temperature 105°, and gradual creeping of disease toward the knee. Application was made an inch beyond erysipelas margin as often as spreading was noticed. By evening the

temperature was 106°, and the patch had nearly reached the knee. I now applied several coatings of the paint one above the other just below the knee, and going above it I surrounded the lower third of the thigh with a tight band of adhesive plaster one inch wide. By the morning of the 9th the erysipelas had extended over the knee and the whole leg was now tensely swollen, painful and tender, with bullæ forming posteriorly. I found the plaster had just been removed because of complaint of tightness, but I at once reapplied it and forbade its being disturbed. During the day the disease extended to the lower border of the adhesive band, where it stopped abruptly. The temperature fell and convalescence began. The erysipelas was at an end in three days, but where the iodine had been applied in several coats below the knee there was a burning of the skin which took ten days to heal. The erysipelas had gone beyond the thick coating of iodine, but had been arrested so suddenly at the plaster that the family physician and friends were convinced equally with myself of the efficacy of this method, first proposed, I believe, by Wölffler, and recently recommended by Dr. Weber, of this city.

Other attempts at formation of a barrier have failed in my hands, excepting the partial success following scarification. I had previously tried iodine and strong solutions of silver, but do not remember a successful case. It has seemed to me that the power of the cocci to penetrate deeply into the tissues and their mode of travelling through the lymph channels rendered any method dealing with the surface alone as unlikely to check the spread. I can understand, however, how pretty firm compression of all the tissues of a limb, as by a tight band, might act in checking the onward march of the microörganisms. It is at least a rational proceedure.

Scarification has had much said in its favor, and I have no doubt proves and will prove beneficial in some cases. To be successful, however, it must be repeated on successive days and one line of cuts after another be made as the spreading oversteps the attempted barrier. It is not an entirely new method, as many suppose. Leuroth proposed a method of treatment in the *Gazette Medical de Strasbourg* in 1870 which consisted in superficial linear scarification over the patch with others made so as to circumscribe it. Should the disease overstride this boundary, it was to be tried again.

Dobson is said to have proposed much the same process as early as 1828. Kraske, of Freiburg, operated first by scarification in 1886. After making crossed incisions he applied a five per cent. solution of carbolic.

Riedel in 1887 did the same thing in a number of cases, employing a 1 : 1000 sublimate instead of carbolic, and Lauenstein modified this in 1889 by cutting only in the sound skin. The latter is the process which strikes me most favorably.

Among other recently advocated modes of treatment (and new ones are being daily added, a fact which shows rather that anything may

appear to do good in uncomplicated cases running their natural course), is that of Behrend,[1] consisting of the application of absolute alcohol; that of Hueter, who advises injections of a 3 per cent. carbolic solution to encircle the patch. If a case is thus treated in an early stage, it is said to be possible to stop the whole process within twenty-four to forty-eight hours. J. Koch paints the diseased parts once daily with an ointment of

℞.—Creolin	1 part.
Lanolin	10 parts.
Iodoform	4 parts.

and over this applies gutta-percha tissue. Kroell advises a band of gutta-percha in place of Wölffler's adhesive strip.

Calvelli uses a 1 per cent. solution of picric acid to paint over the erysipelas. Pirogoff, it will be remembered, treated a large series of cases by camphor, I believe in the army, with excellent results. (His paper is not now accessible to me.) Rosenthal[2] has employed with marked success a combination of the Pirogoff and Hueter methods, giving 2½ grains of camphor at a dose.

Levy proposes[3] a spray of corrosive sublimate in ether 1 : 100, to be applied for a few minutes twice daily. Under this the fever in his cases lasted but three and a half days, while other methods showed eight days of fever.

With the most of these latter suggestions I have had no experience. In view of what I have learned from those cases which have fallen under my observation, I think the plan of treatment which offers the best results is about as follows:

First, internally, such symptomatic treatment as the nature of the case seems to require. Antipyretics only in case of high or persistent fever (over 103½° to 104°). Then antipyrine in dose of at least gr. xv–xx, for an adult, guarded by alcohol. Cooling drinks. Calomel or saline aperients in full dose if constipation. If much weakness, alcoholic drinks given freely, especially at critical periods, and iron or iron and quinine; digitalis if much fever and prostration; bromides for delirium; antipyrine or phenacetin for headache, with cold applications to head, and as concentrated and nutritious a diet as possible.

Second, locally, I would paint the patch and surrounding margin of healthy skin thickly with ichthyol in collodion, ʒj–ʒij to ℥j. If the scalp is the region affected, a watery solution or ointment of ichthyol can be employed. To arrest the spread I should in every case make an attempt either with the band of adhesive plaster or by scarification, or both, the latter to follow the former, in case the disease spreads beyond the

[1] Berlin klin. Wochenschrift, 1889.
[2] Ibid., No. 42, 1889.
[3] Médecine Moderne, No. 20.

adhesive strips. In erysipelas of the face which had not yet reached the forehead, or at least its upper part, I would apply a band tightly about the forehead and just above the ears, cutting the hair in a strip around if necessary to secure firm pressure. The chances of arresting the process here should be at least equal to those of checking the spread upon an extremity, for we have a hard bony base over which to make our compression. If the boundary is passed, then I should at once have the scalp shaved and apply another band higher up. The hair should be cut in any case in which the scalp is invaded or threatened. Then the same application of ichthyol in collodion can be made, as to the face or other part. If there be much tension, swelling, heat, and discomfort, (which is not apt to be the case under collodion), any oily substance can be applied over it.

In treating erysipelas the uncertainty of *prognosis* must always be kept in mind. Cases to all appearances mild in the beginning may become severe and prove fatal, while formidable appearing areas may suddenly cease spreading spontaneously. It is scarcely more safe to say a case will progress favorably (though the great majority do) than to claim that the particular line of treatment instituted has prevented an unfavorable termination, or proven abortive, unless a whole series of cases under a given method have terminated in a shorter than the average time.

Naturally, when the erysipelatous process has its sources in a pus collection such as an abscess, pustule, ulcer, foul wound, carious tooth, diseased duct, etc., the first care must be to secure as prompt and thorough disinfection and cleansing as possible. Pus must be destroyed and purity maintained. A solution of the peroxide of hydrogen will often be found useful in effecting this purpose. In such case a spontaneous halt may be hoped for. In the same way a diseased mucous membrane must be cared for; excoriations, ulcerations, rhinitis or other disease of the nasal mucous membrane or affection of the throat must be looked after. It is probable that every case of facial erysipelas starts from some local solution of continuity either upon the skin or adjacent mucous membranes, and we simply call some cases "idiopathic" or "genuine" when we fail to find the point where the micrococci have entered. I further believe it is because of this close proximity of various mucous membranes that erysipelas of the face is so comparatively frequent. That so-called idiopathic erysipelas of the face is identical with the traumatic variety I think is shown by the clinical history, course, and identity of the skin lesions in both processes, as is illustrated by Cases XXIV. and XXXII., where the husband's recovery from erysipelas of the leg was coincident with an outbreak of facial erysipelas in the wife. Since instances of direct contagion are not often seen, I would call attention to the frequency with which two cases occurred in the same family—no less than

six times in the 47 cases. Twice husband and wife, twice in brothers, once mother and son, and once grandmother and grandchild. It will be noted in the histories given that internal treatment played a very unimportant part, and I am convinced that cases do quite as well without the large doses of iron so habitually given in this country.

As a prophylactic measure in those predisposed to repeated attacks, great care should be taken to discover and cure affections of mucous membranes, carious teeth, ulcerations, or other disease processes or conditions which I have mentioned as possible means of maintaining the tendency. Recurrences after apparent cure must be kept in mind and treatment continued sufficiently long to prevent them.

Since this paper was written I have applied the adhesive strip in three cases. Two were in erysipelas confined to the lower extremity. In the third it had already extended over the buttocks to the lumbar region before I saw the case. In the latter I applied a strip nearly two inches wide tightly about the abdomen, and painted the patch with 10 per cent. of aristol in collodion. No spreading occurred, and convalescence began at once. In one of the other cases the same treatment was successful, but failed in the second to arrest extension of the disease.

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REVIEWS.

INFLUENZA, OR EPIDEMIC CATARRHAL FEVER. AN HISTORICAL SURVEY OF PAST EPIDEMICS IN GREAT BRITAIN FROM 1510 TO 1890. Being a new and revised edition of *Annals of Influenza*, by THEOPHILUS THOMPSON, M.D., F.R.C.P., F.R.S. By E. SYMES THOMPSON, M.D., F.R.C.P., Gresham Professor of Medicine and Consulting Physician to the Hospital for Consumptives and Diseases of the Chest, Brompton. 8vo. pp. 490. London: Percival & Co., 1890.

THE interest of this book, as indicated by its title, is chiefly historical, but this is far from saying that it is not also of decided practical value. One fact which stands out prominently before the eye of the discriminating reader shows the fallacy of any system of medicine which prescribes for the disease rather than for the patient. The fact to which we refer is the variation of epidemic type, which is perhaps more marked in influenza than in any other affection. Regarding mankind as an individual, and supposing, as everyone does, the causes of disease to retain their identity, it must be admitted either that both suffer marked alterations with age, or that both undergo temporary modifications from transient external influences. The fact that much can be said in favor of each of these propositions might be regarded by the unreflecting as proof of greatly increased knowledge, but the ability to discuss does not necessarily imply wisdom. As regards influenza, the rays, so to speak, of which our knowledge is composed, instead of all uniting in a common focus, are, many of them, widely divergent. Indeed, little has been learned from the various epidemics beyond the fact that the disease is infectious, and this is nothing new. As our author pithily remarks: "The nomenclature of the disease, now definitely known as influenza, is not of the clearest. It is said that the word was originally introduced by the Italians, at a time when less was understood of its nature and origin than at present, if, indeed, this be possible."

It was an excellent idea to embody the writings of our professional forefathers in a modern treatise, if only that they might serve as studies of English style of a time when, as many hold, English was at its best. In this statement we refer particularly to the accounts of Willis, Short, and Sydenham, of which the quaint phraseology, instead of impairing their scientific value, rather serves to give them zest and flavor.

It is superfluous to say that this work will take a permanent place in the literature of influenza, for it is largely made up of writings recognized as classic. Dr. Thompson has brought it down to the present time by adding an account of the epidemic of 1889–90, which we can heartily recommend to all interested in this medical topic of the day.

F. P. H.

KOCH'S REMEDY IN RELATION SPECIALLY TO THROAT CONSUMPTION. By LENNOX BROWNE, F.R.C.S. Ed. Illustrated by 31 cases and by 50 original engravings and diagrams. 8vo. pp. 114. London and Philadelphia: Lea Bros. & Co., 1891.

THAT a considerable monograph, based upon personal observations of 31 patients—14 seen under Gerhardt's care and 8 under Krause's in Berlin, and 9 under his own care—and copiously illustrated by laryngoscopic drawings and temperature charts, should have appeared as early as January, is an evidence of great assiduity on the part of the author, and, whatever be the outcome of the treatment, the effort will command appreciation for all time, for the accuracy with which the changes noted have been described and illustrated.

Beginning with a review of the author's previously published opinions on tuberculous laryngitis, in which he contended for the possibility of its existence as a primary lesion long before the fact had been demonstrated, Mr. Browne adds, as corollary to Virchow's statement, that the larynx is the most appropriate organ for the study of true tubercle, that it is also the most appropriate and convenient site for accurate observation of the various stages of its development toward reparation which takes place under Koch's treatment. He endeavors to show, step by step, that every stage in the life-history of the disease, which may extend over many months, or even years, can, under Koch's treatment, be developed and be compressed into a space of a few days, or, at most, of a few weeks, Not only this, but that reparation of ulcers and necroses may take place with amazing rapidity as recognizable in a series of laryngoscopic images observed from day to day.

While points of similarity occur in the natural evolution of the disease and in the evolution induced by the Koch treatment, there are a number of differences, the knowledge of which is important. Instead of the pallor peculiar to the natural form of the disease, reddening of the surface is produced under the injections, sometimes to an intense degree, and in some cases to such an extent as would lead to error in diagnosis by one ignorant of the treatment. Interarytenoid tumefaction, pyriform infiltration of the arytenoid regions, and the horseshoe and turban-shaped tumefactions of the epiglottis take place in the modified or induced laryngeal tuberculosis of the injection treatment, as they do in the natural evolution of the disease. In addition, infiltration often occurs lower down the larynx, not only in the ventricular bands, in the vocal bands, or directly beneath, leading to constriction of the lumen of the larynx as in the natural form, but with a levelling, as it were, of the horizontal planes of the larynx, so that the swollen ventricular band is almost on a line with the ary-epiglottic fold; while there is obscuration of the natural lines of definition and contour of the various component intra-laryngeal structures. These conditions lead to a stenosis which is one of the dangers to be apprehended as an immediate reactionary result of an injection, not always to be avoided even by very small or by slowly increased quantities of the remedy, or by its infrequent repetition. The gravity of this condition, however, is stated to have been grossly exaggerated. Ulcerations occurring under Koch treatment in the process of elimination of the necrotic tissues are rarely active at more than one or

two points. Their color is at first white or whitish-gray with intensely red areolas, changing to pale yellow in a day, not unlike the appearance of the lenticular ulcer seen in connection with the exanthemata as well as with tuberculosis. Ulcerations in progress when the treatment is instituted become redder and are bathed in liquid pus for a day or two, after which they become cleaner and show a tendency to repair, though cicatrization is less rapid than is the case with erosions induced by the treatment. The rapidity of the process seems to account for the fact that perichondrial inflammation does not appear to progress to death of the cartilage. On the other hand, ulceration of the epiglottis at least has been seen to undergo arrest, and has been known to have undergone partial repair. Occasionally an area of disease has been aroused in the trachea.

The subjective symptoms, hoarseness, loss of voice, dysphagia, and suffocative dyspnœa may each and all be induced and subside with impressively distinctive rapidity. Extreme sensibility to laryngoscopic examination diminishes under the Koch treatment as does pain attending glutition. Mr. Lennox Browne would select those cases for treatment in which the pulmonary lesions were as chronic or limited as possible. He alludes to the risk of developing severe pulmonary complications, to arousing a latent pulmonary infiltration or the recrudescence of a lesion believed to have been healed. The existence of fibroid changes in the lungs would contra-indicate the treatment, or at least indicate great care in its employment.

The cases which form the basis of the observations recorded are described with more or less detail, and are largely illustrated by laryngoscopic pictures. It can hardly be conceded, however, that the results are encouraging enough to justify the conclusions of the author that they warrant perseverance in pursuing the treatment, even provided that due caution be exercised in the selection of patients and in every detail of administration.

There is much argumentative and instructive matter of general interest in connection with tuberculosis and its reaction under the tuberculin, the subject-matter of which must now be so familiar to our readers as to render further allusion to it superfluous. J. S. C.

THE PROCLIVITY OF WOMEN TO CANCEROUS DISEASES AND TO CERTAIN BENIGN TUMORS, WITH AN APPENDIX ON HEREDITY AS A CAUSE OF CANCER. By HERBERT SNOW, M.D. Lond., etc. Pp. 58. London: J. & A. Churchill, 1891.

THIS little brochure is a lecture delivered at the London Cancer Hospital by one of the attending surgeons. The facts presented, while not especially new, are interesting and suggestive. Statistics form a prominent feature of the argument, and medical statistics, as Billings has conclusively shown, are only reliable when employed in a scientific manner.

The author's deductions are not all equally sound, since they may be divided into two classes: those resting upon a basis of fact, and those founded upon premises which are purely theoretical. We cannot deny

that the greater number of cases of cancer occur in women, and that the disease affects most frequently the breasts or uterus; but the statement that fibrous tumors of these organs are due to imperfect nutrition or perverted functional activity in civilized, as compared with savage, races is one not supported by such evidence as the scientific student demands. Is it a fact that carcinoma is "almost absent in the savage, while rapidly increasing in prevalence among the civilized?"

An ingenious attempt is made to show that the neurotic factor holds a position in the etiology of cancer hardly secondary to that of traumatism. "We never (?) see," the author remarks, "malignant disease of the pathological species in question (except as the result of injury) developed in the mamma of a woman leading a healthy, happy, well-balanced life."

The connection which he seeks to establish between chronic invalidism (which he attributes to the powerful causes, constipation, corsets, overstudy and tea-drinking) and malignant disease is somewhat obscure, though the argument is by no means unfamiliar.

More interesting to the reader than the lecture itself will be the short appendix on heredity, in which, after carefully weighing the statistical evidence pro and con, the author arrives at these conclusions:

"1. That belief in heredity is derived merely from popular tradition, and is wanting in any sound basis of scientific proof.

"2. That extremely practical issues are involved, and that the views now prevalent often lead to disastrous results." H. C. C.

ESSENTIALS OF SURGERY, TOGETHER WITH A FULL DESCRIPTION OF THE HANDKERCHIEF AND ROLLER BANDAGE. Arranged in the form of Questions and Answers. Prepared especially for Students of Medicine. By EDWARD MARTIN, A.M., M.D., Instructor in Operative Surgery, University of Pennsylvania; Surgeon to the Howard Hospital; Assistant Surgeon to the University Hospital. Illustrated. Fourth Edition. Revised and enlarged by an Appendix. Philadelphia: W. B. Saunders, 1891.

THE development of special departments in modern medicine, and the consequent overcrowding of the student's time, have made necessary some measures of relief. While it is easy to say that a student should not be helped to a parrot-like method of acquiring knowledge by putting in his hands an epitome arranged in the form of question and answer, there are two sides to the question from the student's point of view. The wisdom of so planning a course in medicine that the work of five years is attempted in three may be questioned, but where such a plan is in force the student must accommodate himself.

Doubly unfortunate is it when, as is too often the case, fundamental subjects like general surgery are submitted to a scaling process. While such a book as that under consideration is, without doubt, abused by the indolent, it has still a limited field in helping the better student under pressure to crystallize information obtained in other ways. The question whether this epitome fills the place well is partially answered by the fact that four editions have been called for in a little more than two years.

The author has at command good English, and has, moreover, a happy way of saying definite things directly. There is a freedom from provincial or personal teaching which is very commendable. The treatment advocated, while it represents fairly that which is taught at the University of Pennsylvania, is in general decisive, but safe, and such as would, with a few exceptions, be accepted anywhere as sound. The plan of giving constantly definite suggestions for a typical treatment might be adopted with advantage by many systematic authors. It is not alone the beginner who sometimes searches in vain for a working method among the generalities of a text-book.

For such value as they may have, the appendix contains formulas with brief directions for the medical treatment of many surgical affections. Here, also, may be found explicit directions for the preparation of the usual antiseptic materials, including Lister's double-cyanide gauze. The book is one of the best of its class. G. E. S.

RECENT WORKS ON DIAGNOSIS:

LEHRBUCH DER AUSCULTATION UND PERCUSSION, MIT BESONDERER BERÜCKSICHTIGUNG DER BESICHTIGUNG, BETASTUNG, UND MESSUNG DER BRUST UND DES UNTERLIEBES ZUR DIAGNOSTISCHEN ZWECKEN. Von DR. C. GERHARDT. Fünfte, vermehrte und verbesserte Auflage. Pp. 363. Tübingen, 1890.

(HANDBOOK OF AUSCULTATION AND PERCUSSION, WITH SPECIAL CONSIDERATION OF INSPECTION, PALPATION, AND MENSURATION OF THE CHEST AND ABDOMEN FOR DIAGNOSTIC PURPOSES. By DR. C. GERHARDT. Fifth, improved and corrected edition.)

AUSCULTATION AND PERCUSSION. By FREDERICK C. SHATTUCK, M.D., Professor of Clinical Medicine in Harvard University. Pp. 121. Detroit: George S. Davis, 1890.

THE PHYSICAL DIAGNOSIS OF THE DISEASES OF THE HEART AND LUNGS AND THORACIC ANEURISM. By D. W. CAMMANN, B.S. Oxon., M.D. Pp. 178. New York and London: G. P. Putnam's Sons, 1891.

A GUIDE TO THE PRACTICAL EXAMINATION OF URINE. FOR THE USE OF STUDENTS AND PHYSICIANS. By JAMES TYSON, M.D., Professor of Clinical Medicine in the University of Pennsylvania, etc. Seventh edition. Pp. 255. Philadelphia: P. Blakiston, Son & Co., 1891.

NOTES ON TYPHOID FEVER; TROPICAL LIFE AND ITS SEQUELÆ. By JEFFERY A. MARSTON, M.D., C.B., M.R.C.P., F.R.C.S., Surgeon-General Medical Staff (retired). Pp. 165. London: H. K. Lewis, 1890.

DIFFERENTIATION IN RHEUMATIC DISEASES (SO CALLED). Read before the Bristol Medico-Chirurgical Association. By HUGH LANE, L.R.C.P., etc. Pp. 27. London: J. & A. Churchill, 1890.

LITTLE need be said regarding a work so well and favorably known to the reader of German interested in methods of medical diagnosis as that of Gerhardt, beyond a brief mention of the appearance of a new

edition after the lapse of a number of years. This edition has been brought fully up to date in the various departments of physical diagnosis, of which it so ably deals. We know of no manual so complete without superfluous details. It is to be regretted that no English translation exists for the use of those who cannot readily read it in the original.

Dr. Shattuck's *Auscultation and Percussion* is one of the "Physician's Leisure Library," an excellent and popular series, issued in attractive form in neat paper cover for the modest sum of twenty-five cents. It covers a similar field to that of Gerhardt, though much less completely. It furnishes, however, an excellent *résumé*, in small compass, of the essentials of auscultation and percussion, and, so far as it goes, is quite beyond other criticism than that applicable to all more recent books on this subject—that the necessity for them does not exist. But since none has before been brought so within the reach of the most impecunious, its publication may not be amiss.

We cannot speak in very favorable terms of Dr. Cammann's manual, regarding it in the light of what he states he has endeavored to make it —a text-book on the Physical Diagnosis of Diseases of the Heart and Lungs. In addition to the criticism just applied to Dr. Shattuck's book, this one merits censure because of its inaccuracies and of the extreme views expressed on debatable points, the result of which cannot but be misleading to the student who looks to it for guidance. Not being satisfied with the generally accepted explanation of the origin and cause of crepitant and subcrepitant râles, and believing that identical rhonchi may be produced in the pleura, the author holds, as regards crepitant râles at least, that they are always of pleural production. There is no doubt that occasionally pleural friction may so closely resemble true crepitant and subcrepitant intra-pulmonary rhonchi that it is impossible to indubitably differentiate their site of production without attention to accompanying signs; but there are few who will accept, with this author, that these râles are always intra-pleural. According to this view, which Dr. Cammann devotes considerable space and ingenious argument to prove, the crepitant râle is indicative not of pneumonia but of pleurisy, and when encountered in the first stage of pneumonia indicates an accompanying pleuritis; so that in uncomplicated pneumonia the crepitant râle would not be present. Dr. Cammann neglects to explain why crepitation disappears with the onset of solidification and reappears with resolution. According to his view crepitus should be decided in the second stage of pneumonia; for he states that, to produce a shower of crepitant râles, an abundance of pleural exudation is necessary, and the accompanying pleuritis is more likely to furnish an abundance of exudate in the stage of consolidation than in that of engorgement.

It is very evident, however, that Dr. Cammann does not make a very nice distinction between crepitant and other forms of râles, for we find he states that crepitant râles are *usually* heard with inspiration, occasionally throughout it, and *sometimes* only at its close; indicating that they also occur with expiration. This may reasonably account for his ultra position. It is elsewhere, we believe, pretty well accepted that the true vesicular râles are heard only with the *end* of inspiration and never with expiration, while fine subcrepitant râles and friction-sounds resembling these and the crepitant râle occur with both *in-* and *ex*piration.

Under the caption, Respiration in Health, it is stated that the dura-

tion of inspiration is three or four times longer than that of expiration. This, of course, applies to the *time* that the two signs are audible to the auscultator, but this is not made clear, and the ratio might be supposed to apply to the relative duration of inspiration and expiration, which of course is very different from this.

Dr. Cammann fails to grasp the difference between puerile respiration and harsh or vesiculo-bronchial, using these terms synonymously. Flint long ago pointed out the distinction, which, if not recognized, might readily lead to error. Puerile respiration has as its distinctive feature *increase in intensity without alteration in pitch;* whereas, harsh or vesiculo-bronchial breathing has alone *elevation in pitch.* Harsh respiration is a mingling of the bronchial and vesicular elements in varying proportions, while puerile respiration is simply an increased vesicular murmur.

The curious statement appears on page 157 that basic anæmic murmurs are usually heard in the aortic area and less commonly over the pulmonary.

We fear Dr. Cammann is somewhat over-sanguine as to the possibilities of auscultatory percussion. There is no doubt as to the great value of this much-neglected and little-understood method in the differentiation of organs and in outlining their boundaries, but that it ever can be of much practical use in detecting morbid changes in the viscera, especially the kidneys, through alteration in their percussion-note, is very problematical.

Little opportunity has been afforded Dr. Tyson to materially revise this edition of his very popular *Practical Examination of Urine,* because of few changes of importance in urine-testing occurring since the preceding issue of this book. The excellent albumimeter of Esbach is described; the newer tests for sugar are given, and a half-page is devoted to the description of phosphatic diabetes, an ailment which has recently attracted some attention abroad through the writings of Teissier and Ralfe.

Dr. Marston has prepared some very interesting notes, based on a large experience with enteric fever occurring among British troops in India. As is well known, enteric fever always has been very prevalent among these in that country, while it is exceptionally rare among the native population. Two powerful factors combine to enormously increase the susceptibility of the recruit to enteric fever—early manhood and recent arrival in a new, hot climate. So that no better opportunity could be afforded of studying the natural history of the disease than is presented in India.

Clinical features and anatomical characters of typhoid fever are the same in India as elsewhere, but whether the etiological factors are always similar Dr. Marston regards as somewhat doubtful. His remarks on causation are of great interest, based as they are on wide experience and accurate judgment. He finds himself unable to account for the origin of all cases of Indian enteric fever by the view of Budd (specific infection), or even by that of Murchison, and seems inclined to look with some favor on the doctrine that under certain conditions (chiefly climatic) this fever may originate unfathered by a specific bacillus or a pythogenic cause. He cannot well understand otherwise the development of certain cases in which all the evidence points against specific infection or spontaneous origin through filth. He, however, regards it

as more difficult, in a country like India, to exclude a pythogenic source than a bacillary one. He does not commit himself positively to either the autogenic or to Murchison's view, evidently feeling that the evidence in either direction is of a negative nature, which may be invalidated by more thorough methods of investigation. In this connection it may be of interest to recall the opinion of Rodet as to the relationship which he believes exists between the bacillus coli communis and the bacillus of Eberth; that under certain conditions the former bacillus, which when cultivated at a temperature of 44° to 46° C. becomes morphologically similar to Eberth's, may acquire pathogenic properties and induce enteric fever. An acceptance of Rodet's views would explain the pathogenic origin of typhoid fever and might throw light on the supposed autogenic cases of Dr. Marston. The altered condition of life of the newly arrived soldier in India, entailing increased physiological activity of the lymphatic and glandular system, especially of those of the intestines, might tend to furnish the suitable conditions for the transformation of the benign bacillus coli communis into the virulent bacillus of Eberth.

The chapters devoted to Tropical Life and its Sequelæ are not the least interesting in the book. They deal with the immediate and remote effect produced on Europeans who have resided in hot climates without having undergone thorough "acclimatization."

Differentiation in Rheumatic Diseases is a graphically illustrated reprint of a paper which appeared in the *Lancet*, October, 1890, by one who has had a large experience with this class of affections. It deals with the diagnosis and treatment of rheumatoid and rheumatic arthritis. The author believes that in most cases of the former a strumous taint exists which is very likely the underlying cause of the rheumatoid condition. It is, however, difficult to understand what he means by struma, since he uses the terms scrofula, struma, and tuberculosis as if they were quite unrelated. But the so-called theory advanced by Mr. Lane as to the association existing between struma, phthisis, and rheumatoid arthritis is not, as he seems to suppose, new. Dr. Garrod long ago stated his belief that the subjects of the tubercular diathesis—which nowadays we are to understand includes struma or scrofulosis—are especially susceptible to it. D. D. S.

THE BARBARITY OF CIRCUMCISION AS A REMEDY FOR CONGENITAL ABNORMALITY. By HERBERT SNOW, M.D. Lond., etc., Surgeon to the Cancer Hospital. London: J. & A. Churchill, 1890.

THE author hopes to "contribute in some small measure toward the abolition of an antiquated practice, involving the infliction of very considerable suffering upon helpless infants."

Circumcision as a religious rite is traced from its first historical employment by Abraham to the present day. It is stated to have been long before that time widely observed among Ethiopians, Egyptians, Phœnicians, and other peoples; while at present the list of those who practise it includes many widely separated nations in Asia, Polynesia,

South America and Africa. It is considered to be "simply and solely a relic of barbarism," long antedating historical record; and as probably associated with a primitive sacrificial idea, the devotion of a part for the whole body to some demon or deity. The practice has no real relation to hygiene as a motive.

The relative frequency of congenital phimosis and its causal relation to many important reflex conditions are admitted. From various eminent surgical writers opinions are quoted in favor of the wide extension of the operation of circumcision. It is admitted also that among uncleanly peoples cleanliness is favored by it, but shaving of the head might be universally advised with as much reason. The argument that it promotes chastity is considered of doubtful value. The evils of possible hemorrhage or sepsis, of unwritten suffering from exposure of highly sensitive surface, of premature excitement in children, of contracted meatus when the operation is early, are thought to weigh against the cutting method of treatment. Separation of adhesions and rapid dilatation of the prepuce under anæsthesia with some simple instrument, such as dressing forceps, will be found, in the author's opinion, to render cutting unnecessary in the large majority of cases.

In this neat little book no claim to originality of thought is made. The subject is simply reviewed, and the above conclusion drawn, with copious reference to a literature which is already sufficiently exhaustive.

G. E. S.

ESSAY ON MEDICAL PNEUMATOLOGY: A PHYSIOLOGICAL, CLINICAL AND THERAPEUTIC INVESTIGATION OF THE GASES. By J. N. DEMARQUAY, Surgeon to the Municipal Hospital, Paris, and of the Council of State, etc. Translated with Notes, Additions, and Omissions, by SAMUEL S. WALLIAN, A.M., M.D. 8vo., pp. xvi. 300. Philadelphia and London: F. A. Davis, 1890.

THE work before us is a translation of portions of the original of Demarquay, reported to the Academy of Medicine of Paris and published in 1866. The section on emphysema, and the chapters devoted to experiments with carbonic acid, in the original, are omitted in the translation; while at the conclusion of the work the translator has introduced notes, comments and additions. The subject of the gases in the blood is first taken up; then oxygen is discussed from an historical point of view, as to its physiological action, its mode of preparation and administration, and its therapeutic application; finally, some consideration is devoted to nitrogen, nitrogen monoxide and hydrogen. The subject of pneumatology has not, perhaps, received the attention, nor its principles the general application, which their importance deserves. Within the past few years, however, a fair amount of work in this department of therapeutics has been done, and the current literature contains numerous papers in evidence of the growing interest in the subject of the use of oxygen as a therapeutic agent. The translator's statement that Demarquay's work had been ignored in this country is erroneous. As long ago as 1867, it and the whole subject of pneumatotherapy received full attention at the hands of J. Solis-Cohen in his work on *Inhalation in the Treatment of Diseases.* Dr. Wallian by his labors has contributed materially to disseminate the principles of pneumatology, and to indicate the lines of their practical application.

A. A. E.

PROGRESS

OF

MEDICAL SCIENCE.

THERAPEUTICS.

UNDER THE CHARGE OF

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Corrosive Sublimate as a Disinfectant.

Experiments published by Dr. A. C. Abbott, made in the pathological laboratory of the Johns Hopkins Hospital, have a very practical bearing upon the value of corrosive sublimate as a germicide, and the results of these experiments lessen the high estimation in which this agent has been held by most investigators.

Dr. Abbott selected the staphylococcus pyogenes aureus for a series of experiments as to germicide power in consequence of the importance of this subject to the surgeon.

The tests hitherto made upon corrosive sublimate as a disinfectant have agreed in giving to it the first place in the list of these agents.

One method commonly employed in testing the value of any chemical substance as a disinfectant is to expose organisms dried upon bits of silk thread to its action for different lengths of time, and then, after removing and carefully washing the threads in water and alcohol, to place them in nutrient media at a favorable temperature and notice if any growth results from them. If no growth appears, the disinfection was presumably successful. Another common method is to mix fluid cultures of organisms with the disinfectant, and, after different intervals of time, a portion is taken from the mixture and placed in nutrient media just as in the other method.

Now, in both of these methods it is easy to see that unless special precautions are taken a minute portion of sublimate may be carried along with the thread or drop into the medium which is to determine whether or not the organisms on the thread or in the drop still possess the power of growth. For organisms in their normal condition—that is, those which have never been exposed to the action of a disinfectant—the amount necessary to restrain growth, for certain disinfecting agents, is very small indeed; and for those

organisms which have previously been exposed for a time to such agents, Geppert shows it is very much less.

In the case of the organism we are considering, Dr. Abbott finds the amount of sublimate necessary to prevent the growth of perfectly normal staphylococci to be 1 part of sublimate in 75,000 parts of the ordinary peptone bouillon, or 200,000 parts of bouillon without peptones. So that, if organisms which have been once exposed to stronger solutions of this salt (1 to 1000) require less than these amounts to inhibit their growth, it is plain that special precautions must be taken to prevent transportation of this minute trace into the nutrient medium which is to demonstrate whether or not the organisms are capable of development.

The author gives in detail a series of experiments, and draws the following conclusions:

That, under the most favorable conditions, a given amount of sublimate has the property of rendering inert only a certain number of individual organisms —that is to say, the process is a definite chemical one taking place between the protoplasm of the individual bacteria and the sublimate in the solution.

The disinfecting activity of the sublimate against organisms is profoundly influenced by the proportion of albuminous material contained in the medium in which the bacteria are present. It was found that the relation between the golden pyogenic staphylococci and sublimate is not a constant one, organisms from different sources and of different ages behaving differently when exposed to the same amount of the disinfectant for the same length of time.

Many of the results of previous experimenters, who have assigned to corrosive sublimate more powerful disinfectant properties against the staphylococcus pyogenes aureus in cultures than the observations reported in this paper indicate, are attributable to the neglect of certain precautions now recognized as essential to the proper conduct of such experiments.

At the present stage of our knowledge in this direction it is plain that for use in surgical practice the solutions of corrosive sublimate do not possess all the advantages hitherto attributed to them.

In regard to the employment of sublimate solutions upon wound-surfaces, it is plain that there exist at least two serious objections: First, the albumin of the tissues and fluids of the body tends to diminish the strength of, or, indeed, renders entirely inert, the solution employed; and, second, the integrity of the tissues is materially injured by the application of this salt. The first objection cannot be met with certainty, for the surgeon possesses no means by which he can determine the amount of albuminous material with which his solutions are to come in contact, and in any case this large amount of albuminous material is an almost insuperable obstacle to complete disinfection with sublimate. He is, therefore, never in a position to say, *a priori*, that his efforts at disinfection of the wound are or are not successful.

During the past two years we have had sufficient evidence to lead us to believe that the normal tissues and fluids of the body possess the power of rendering inert many kinds of organisms which may have gained access to them. This function is therefore diminished, or, indeed, may be quite destroyed, by any agent which brings about alterations in the constitution of these tissues. We know that just such changes as those to which we refer are known to follow the application of sublimate solutions. It is plain, then,

if we bring about in these tissues a condition of superficial necrosis—the condition following upon the application of sublimate—they are much less able to resist the inroads of infectious organisms than they would have been had they been left in their natural condition.

As a disinfectant, in the strict sense of the word, there are, perhaps, few substances which possess the property in a higher degree than does corrosive sublimate, but at the same time there is nothing which is employed for this purpose that requires greater care in its manipulation, in order to obtain its best results, than does this salt. In practice its action is influenced by a number of conditions which it is difficult, if not quite impossible, to control.

For these reasons we seem hardly justified in continuing to give to it the first place in the list of substances which may be employed practically for the purpose of rendering harmless materials containing the germs of infectious maladies.—*Johns Hopkins Bulletins*, No. 12.

Ointment for Hemorrhoids.

Hydrochlorate of cocaine	grs. xvj.
Sulphate of morphine	grs. v.
Sulphate of atropine	grs. iv.
Powdered tannin	grs. xvj.
Vaseline	℥j.
Essence of rose	q. s.

Make an ointment and apply to the affected parts after each movement from the bowels.

It is necessary to have the discharges of soft consistence.—*Journ. American Med. Assoc.*, 1891.

Antiseptic Treatment of Typhoid Fever.

In a lecture on this subject, at King's College Hospital, Dr. Yeo has called attention to the progress that the idea of an antiseptic treatment of typhoid fever is making amongst physicians in all parts of the world. He is unwilling, in the present stage of our knowledge, to put too much stress upon any particular manner of carrying out this idea, as we have probably not yet arrived at the very best means for doing so. What he says about the application of the idea of antisepsis in typhoid fever by various practitioners is of interest.

Professor Petresco, of Bucharest, has borne valuable testimony to the efficacy of naphthol. He had previously experimented with carbolic acid, salicylic acid, turpentine, benzoic acid, kairin, calomel, corrosive sublimate, and boric acid without any very favorable results. He then tried a saturated solution of sulphide of carbon, with which he was much better pleased; and lastly he tried naphthol, 15 grains three times a day, and had results more favorable than with any other remedy: the rate of mortality was reduced, and the course of the disease favorably modified.

Dr. Clarke, of Bristol, used hydronaphthol in five cases of typhoid fever, and all did well. It soon stopped the diarrhœa, and the stools lost their

offensive odor. He gave from 3 to 4 grains every two hours until the diarrhœa was checked, and then every three hours so long as there was fever.

Dr. Teissier, of Lyons, prefers α-naphthol for producing intestinal antisepsis in typhoid fever. He gives it in 6-grain doses, combined with salicylate of bismuth, and he at the same time promotes free diuresis by cold-water enemata. He also gives enemata of quinine and cinchona as an "antithermic tonic." He observed that as soon as intestinal antisepsis was established the urine became green, the temperature fell, the albuminuria disappeared, the spleen diminished in size, and the tongue became remarkably moist. Convalescence was very rapid. He considers that naphthol acts by sterilizing the bacterial products in the intestine.

Dr. Schwartz has demonstrated that naphthalene administered internally diminishes the number of bacilli in fecal matter in the proportion of one-third to one-fourth. When its administration is discontinued, this proportion increases again. But naphthalene is not so safe or suitable an intestinal antiseptic as β-naphthol or α-naphthol.

Dr. W. H. Thompson, of the Roosevelt Hospital, New York, is an advocate of intestinal antisepsis in typhoid fever. He looks carefully after the food administered; he never gives milk undiluted, but always mixed with an equal quantity of lime-water. He objects to beef-tea as setting up gastro-intestinal fermentation. He gives, also, 10 grains of saccharated pepsin with 10 minims of dilute hydrochloric acid every three hours. He also gives 10 grains of subcarbonate of bismuth every three hours; sometimes both medicines every two hours. He regards these as the best agents for the purposes of intestinal antisepsis.

Many physicians have recorded their approval of an initial laxative, and no doubt it is well, if there is no diarrhœa, to begin with one; we shall then have less hesitation in keeping the bowels quiet afterward. Indeed, it has been said that "purgation and antisepsis are, to some extent, interchangeable terms." An aperient expels the poisonous ptomaines and other decomposing substances from the intestinal canal, and, if given in the early stages, may actually prevent subsequent serious diarrhœa. But the use of aperients, to be perfectly safe, must be limited to the first ten or twelve days of the fever, the great risk attending their use in the later stages is the possibility of the existence of deep ulceration in the ileum, and, in that case, an aperient may mean the difference between life and death to the patient. At that period of the disease intestinal antisepsis can only be safely secured by the use of intestinal antiseptics.—*Lancet*, No. 3529, 1891.

Diagnostic Value.

Before the Niederrheinische Gesellschaft für Natur und Heilkunde, Schultze (*Deutsche med. Wochenschr.*, March 26, 1891) stated that he did not consider the occurrence of reaction following injection of the Koch fluid, in cases in which tuberculosis was not suspected, as diagnostic of latent tuberculosis, as he had seen reaction take place in cases not tuberculous. In seventy-two cases of pulmonary and laryngeal tuberculosis treated with tuberculin, he found, by comparison, that the results did not materially differ from those obtained in previous years with other methods of treatment.

An Alkaloid from Tubercle Bacilli.

By treating the contents of tubes containing agar-agar cultures of the tubercle bacillus with hot water acidulated with hydrochloric acid, filtering, evaporating, precipitating with platinum chloride, separating the double salt with hydrogen sulphide, filtering, and evaporating to dryness, Zuelzer (*Berliner klin. Wochenschrift*, 1891) was able to obtain a chloride of an alkaloid, 0.01 of which, injected into rabbits and guinea-pigs, caused, in from three to five minutes, increased frequency of respiration, elevation of temperature and protrusion of the eyeballs. The eyes were brilliant, the pupils slightly dilated and the conjunctiva injected. The protrusion was the more marked on the side on which the injection was made. The symptoms lasted for from fifteen to twenty minutes. Three rabbits died after injections of 0.02 or 0.03. The muscles into which the injections were made were reddened and the seat of hemorrhages; there were also hemorrhages in the mucous membrane of the stomach and of the upper portion of the duodenum. In two cases there was ascites. Similar results followed introduction of the substance into the conjunctival sac.

The Chemistry and Toxicology of the Tubercle Bacillus.

Weyl (*Deutsche med. Wochenschrift*, 1891) examined, at the Hygienic Institute at Berlin, the product obtained by treating with dilute sodic hydrate, the scrapings from 600 glycerin-agar cultures of the tubercle bacillus. The yellowish turbid mixture coagulated, by gradual cooling, into two layers—an upper, resembling coagulated agar, and a lower, containing small, white shreds. The lower layer, after treatment with warm dilute sodic hydrate, consisted, microscopically, of folded membranes, and at irregular intervals of apparent, inflated tubes. It contained carbon, hydrogen, sulphur and nitrogen. Special interest attached to it because it displayed the specific staining qualities of the tubercle bacillus. This "white substance" probably represents the capsule of the bacillus, while the gelatinous substance of the upper layer represents the protoplasm of the organism. Analysis of this gelatinous substance places it among the mucins. Solutions of it were prepared and injected subcutaneously into rabbits, guinea-pigs and mice. In the guinea-pigs and mice, at the end of three or four days, local necrosis took place at the site of injection and a crust formed, which fell off in four or five days. From these experiments Weyl concludes that from cultures of tubercle bacilli a toxomucin can be obtained, which he does not believe to exist preformed in the bacilli.

Hydrochlorate of Phenocoll—a New Antipyretic and Anti-rheumatic.

This substance appears in the form of a white powder soluble in water. It is a compound of phenetidine and seems to be similar in action to antipyrine. Fifteen grains of phenocoll reduces the temperature about as much as would be accomplished by 22 to 30 grains of antipyrine or about 15 grains

of phenacetine. It has analgesic properties in doses of 7 to 15 grains.—*Deutsche med. Wochenschrift*, No. 15, 1891.

Vegetations on the Genitals.

℞.—Acid. salicylic. . . . . grs. viij.
Acid. acetic. . . . . ʒij.

Apply to the warts with a camel's-hair brush once or twice a day.—*Médecine Moderne*, 1891.

Piperazin.

This substance has the property of dissolving a large proportion of uric acid. One part of the urate of this substance is soluble in about 50 parts of water. Urate of lithia requires 368 parts of water to dissolve it; the piperazin salt is, therefore, seven times more soluble than the lithia salt. Piperazin is not toxic and not caustic, and it appears to have advantages over other substances which may be used to act as solvents for uric acid. It seems to be worthy of trial in suitable cases.—*Berliner klinische Wochenschrift*, No. 14, 1891.

Methods for the Administration of Amyl-hydrate.

A teaspoonful of amyl-hydrate may be taken at night in a small glass of beer. It should be stirred for seven minutes to insure solution. Or, of the following, one-half may be taken at night:

Hydrate of amyl		ʒi.
Water Orange-flower water	}	āā ʒij.
Syrup of bitter orange		ʒj.

It is necessary to remember that amyl-hydrate dissolves slowly in water and beer (one part to eight).

Amyl-hydrate may also be given in capsules, each one containing one-quarter of a drachm; three or four of these may be used for a dose.—*Nouveaux Remèdes*, No. 2, 1891.

Death during Chloroform Administration.

The patient was a bright, perfectly healthy little girl, about eleven years of age. The operation was for the removal of a large mole, covering the greater portion of the surface of the cheek. There was nothing in the appearance of the child upon examination that would contra-indicate the use of an anæsthetic in any way, and chloroform was chosen.

The operation was done by Dr. C. T. Parkes, surgeon to the Presbyterian Hospital, Chicago, and the chloroform was administered by internes of that hospital.

The operation required about twenty-five minutes, and as it was about the face, the hands of the surgeon prevented the continuous administration of the anæsthetic; very little chloroform was given to the child. The instrument used for giving the anæsthetic was Esmarch's inhaler, a wire frame

covered with flannel, with which it is impossible to absolutely prevent the entrance of air. The child made no demonstration of any kind that would attract attention. The operation was practically completed; the pigmented nævus was removed, and pieces of skin taken from the thigh for tranplantation, to cover the defects and diminish the amount of scar, were being put in position; when, without any warning, without the administration of any chloroform for at least five minutes, the child was seized with general convulsions; she ceased to breathe, her heart ceased to beat, she gave a few gasps, and was dead.

Every effort was made for an hour and a half to restore circulation and respiration, by artificial respiration, injection of ether and whiskey and nitrite of amyl, and the use of electricity, but all efforts failed.—*Journal of the American Medical Association*, No. 7, 1891.

Iodoform and Aristol.

Dr. Richtmann recommends that iodoform should in all cases be replaced by aristol; the latter has the advantages of iodine and of thymol without their drawbacks. It is not irritating, its absorption is not followed by toxic symptoms, and its odor is not disagreeable. Unfortunately, it is insoluble in water.

The following are some of the ways in which it may be used:

In the form of powder, externally, or one part dissolved in ten parts of ether for external use.

A mixture containing 3 per cent. of aristol, in 20 of olive oil and 77 of lanolin, is a good application for burns.—*Nouveaux Remèdes*, No. 4, 1891.

MEDICINE.

UNDER THE CHARGE OF

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Tuberculin: Production of Disseminated Miliary Tuberculosis.

Virchow (*Deutsche med. Wochenschr.*, 1891), before the Berlin Medical Society, opposed the view of B. Fränkel, that a period of three weeks must necessarily elapse between the invasion of the bacillus and the appearance of symptoms of miliary tuberculosis in man as in guinea-pigs. He then presented specimens from a case in which miliary tuberculosis appeared

more than three weeks after injection of tuberculin, and which, therefore, escaped criticism. The subject had enjoyed good health until a year previously. In August he had pleurisy, from which he recovered and was well for two months. In mid-December he had another attack, with cough, anorexia, debility, and sharp pain posteriorly on the right side of the chest. Examination, January 16th, revealed a large pleuritic effusion on the right. At the right apex the resonance was slightly impaired, the vesicular murmur enfeebled, and ill-defined râles were heard. The spleen was enlarged. Exploratory puncture brought clear serous fluid. There was slight fever, but no expectoration. The first injection, of 0.02, was made January 19th, and was followed by the usual reaction. January 20th, the effusion, which had reaccumulated, was again withdrawn; the fluid was serous. January 25th, the night-sweats increased; the dulness on the right rose above the angle of the scapula; headache and dry cough set in. February 5th, the seventh injection, of 0.02, was followed by shortness of breath, dryness of the throat, and pain in the right side. February 7th, rusty sputum appeared for the first time, in small quantity. February 8th, the expectoration was mixed with blood; there was pain in the throat. February 9th, the epiglottis was swollen and reddened, with small hemorrhages at its margin; the adjacent wall of the pharynx was swollen, reddened, and the seat of small hemorrhages; its surface was uneven from irregularities which were not typical tubercles; the right ary-epiglottic ligament was swollen, the interior of the larynx only reddened. February 10th, the temperature rose to 104°, and, with remissions, remained at about this level; the expectoration was at no time abundant. February 15th, it was bloody and purulent; for the first time bacilli were found; dyspnœa and cough increased. February 17th, grayish-yellow nodules were for the first time seen on the epiglottis. February 19th, a little more than four weeks after the first injection, coma, pulmonary œdema, cyanosis and death occurred.

The autopsy disclosed a general miliary or submiliary tuberculosis of unusually wide distribution. The lungs were large, inelastic, intensely reddened and slightly œdematous, with slate-colored induration at the apices; on the right there was a bronchiectatic cavity; otherwise the lungs were studded with small and large nodules, mostly miliary tubercles and some miliary areas of inflammation. The spleen was enlarged and pulpy and contained large numbers of delicate, translucent, light-gray submiliary tubercles. The liver, the cortex of the kidney, and the mucous membrane of the larynx and pharynx also contained many tubercles. The thyroid gland contained a small number. The eruption was profuse in the medulla of the upper third of the epiphysis of the femur. Beginning eruption and fibrinous exudate were present in circumscribed areas of the peritoneum and the recto-vesical cul-de-sac.

Oestreich, for Virchow, showed specimens from a female patient, thirty-six years old, admitted to the hospital with involvement of the apices and signs of peritonitis, thought to be tuberculous. Twenty injections were given in the course of six weeks and a half. Each injection was followed by typical reaction, but fever existed also in the intervals. The condition of the patient became worse and death occurred. The apices of the lungs were destroyed by the phthisical process. The upper portion of the lower lobes

presented caseous bronchitis at several points. The peritoneum was studded with innumerable tubercles, from a size scarcely visible to that of a poppy-seed, gray, translucent, microscopically showing no sign of caseation, macroscopically showing retrograde changes. The development of a portion of the tubercles occurred during the time the injections were being given. Between the liver, stomach, spleen, and lung, an abscess had originated from an ulcer of the stomach. The mucous membrane of the intestine had undergone amyloid degeneration.

Production of Acute Tuberculous Meningitis.

Rütimeyer (*Berliner klin. Wochenschrift*, 1891) reports a fatal case of acute tuberculous meningitis arising subsequently to treatment of a case of incipient phthisis with injections of the Koch fluid. Following an attack of influenza, the patient had cough, night-sweats, and a sense of oppression of the chest. There was some impairment of resonance on the right side of the chest, over the apex, anteriorly and posteriorly, with enfeebled vesicular murmur, harsh inspiration and bronchial expiration, and some fine râles. The sputum contained a small number of tubercle bacilli. Thirteen injections, in gradually increasing doses up to 0.03, were given in the course of sixteen days. There was the usual reaction; râles were, for the first time, heard at the left apex; the expectoration was increased; the sputum contained an increased number of bacilli. The patient lost eleven pounds in weight. The injections were withdrawn. Headache and vomiting set in. There were anorexia, weakness, and malaise. The sense of prostration became marked; there were pains in the limbs, mental unrest, and irritability, with a clear sensorium. Sopor, rigidity of the neck, immobility of the pupils, Cheyne-Stokes breathing, tracheal râles and death followed. In addition to miliary tubercles, lobular pneumonia and cavities in the lungs, the pia mater was cloudy and infiltrated, the posterior cranial fossa contained an ounce of reddish fluid, the ventricles were dilated, a small, cheesy nodule was found in the right occipital lobe, another at the base of the cerebellum, and submiliary tubercles at various parts of the brain.

Bacilli in the Blood.

Liebmann, of Trieste, reports (*Berliner klin. Wochenschr.*, 1891) nine cases, in which, after one or several injections of the Koch fluid, tubercle bacilli were found in the blood. In a note, the editor of the *Wochenschrift* disclaims all responsibility for the accuracy of the observations.

Bacilli in the Fluid.

Meyer (*Deutsche med. Wochenschr.*, 1891) found tubercle bacilli in each of five vials of the Koch fluid. To determine if these bacilli possessed activity, he injected portions from three into the anterior chamber of three rabbits, subcutaneously in two rabbits and one guinea-pig and into a vein of the ear of one rabbit. No reaction, either local or general, had occurred at the end of five or six weeks.

Libbertz (*Deutsche med. Wochenschr.*, 1891) makes the following an-

nouncement: In the preparation of tuberculin an occasional tubercle bacillus may find its way into the fluid. No harm results, because the bacilli have been killed by the long-continued action of boiling. Koch states that dead tubercle bacilli introduced beneath the skin cause suppuration. This is true of infusions of cultures containing large numbers of bacilli. Single bacilli give rise to neither local nor general reaction. They cannot gain entrance to the blood-current from the subcutaneous connective tissue if not injected directly into a bloodvessel. Tuberculin is prepared from pure cultures of tubercle bacilli, and in its original condition can contain no other bacteria. Atmospheric germs may subsequently gain entrance, but these are usually not pathogenic and cannot multiply, on account of the large proportion of glycerin which the fluid contains. Tuberculin always has an alkaline reaction.

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Histological Changes.

Nauwerck (*Deutsche med. Wochenschr.*, 1891) presented to the Verein für Wissenschaftliche Heilkunde, at Königsberg, a report of the results of examinations in twenty-one fatal cases and of fifteen specimens removed by operation from patients treated with tuberculin. The injections were followed by hyperæmia and exudative inflammation; not rarely with hemorrhage around the tubercle, which was often infiltrated with polynuclear round cells. In the base of tuberculous ulcers of the bowel, after prolonged treatment, a peculiar isolation of the tubercle was repeatedly observed, the cellular infiltration being limited to the surrounding structure. In a fatal case of gonitis, the appearances were such as to create the impression that acute necrosis and exfoliation had taken place; the surfaces of the exposed bone seemed to have been curetted. The loose structures in the joint presented the microscopic appearances of caseous necrosis. Tubercle bacilli were found in them as well as on the joint-surfaces. The walls of an abscess in connection with caries of the vertebra contained a large number of bacilli, as if, as a result of the injections, an enormous multiplication had taken place. In a fatal case of uro-genital tuberculosis, injections of tuberculin were followed by cough and an increase in the number of bacilli in the urine. The autopsy disclosed cheesy cystitis, ureteritis, old tuberculous pyelo-nephritis on the right, florid pyelo-nephritis on the left, with an eruption of fresh miliary tubercles in the mucous membrane of the pelvis of the kidney. The lungs contained small cavities, groups of gray or yellow nodules and miliary or submiliary tubercles. The spleen and liver contained miliary tubercles. In a fatal case of advanced phthisis, the autopsy revealed a general miliary tuberculosis, with tuberculous meningitis. In the case of a girl, three years old, with an ulcer of one cornea and purulent infiltration of the other, terminating fatally, a croupous exudation was found in the pharynx and larynx, together with a miliary tuberculosis. New nodules developed, in some cases, around older foci of disease. Tuberculous ulceration of the stomach was observed in two cases. Perforation of the pleura and pneumothorax were observed once. In numerous cases pulmonary cavities and intestinal ulcers presented evidences of a tendency to heal.

Untoward Effects in Tuberculosis of Bones.

Braun (*Deutsche med. Wochenschrift*, 1891), before the Verein für Wissenschaftliche Heilkunde, at Königsberg, reported the results of treatment in surgical cases by means of the Koch fluid, covering a period of ten weeks. Adults, with external tuberculosis, in whom pulmonary involvement could not be detected, were given 0.01, children 0.005. Subsequently, the quantity was reduced to 0.005 and 0.003 respectively. Injections were repeated at intervals of two days. Other than transient redness or swelling, there were no local complications. Of 198 injections, in 92 the ascent of the fever-curve began in from five to seven hours; in 49 during the first four hours; in 43 between the seventh and tenth hour; and in only 7, later. The elevation of temperature in all cases was decided. Its duration varied from two to fifty-two hours. The pulse was usually accelerated. In the case of two children, the pulse was slowed and the temperature became subnormal. Headache was a pretty constant phenomenon. Chills occurred after eighty injections out of seven hundred. Cough and shortness of breath were present even when no pulmonary lesion existed. Vomiting, abdominal pain and diarrhœa were occasionally noted. Of 56 patients, 7 had herpes of the lips and cheek; in 10, other exanthemata appeared. In 4 cases an erysipelatoid eruption developed. Constitutional phenomena did not manifest themselves in all cases. Alarming collapse took place in one patient. The local manifestations were not constant. The swelling of an affected joint usually increased; occasionally it diminished. Existing sinuses sometimes closed rapidly. At times secretion was diminished, at others increased. To determine the diagnostic value of the remedy, injections of 0.01 were made in 33 patients in whom tuberculosis could not be detected, and thermometric observations made at intervals of two hours. Fever appeared in 10, but in slight degree. In exceptionally rare cases of tuberculosis injection was not followed by fever. This was demonstrated in a child with inflammation of the knee-joints, the tuberculous nature of which was proved by microscopical examination after an operation performed subsequently. It may be stated that, when local changes occur in a sinus or other evidence of bone or joint disease of doubtful character, following injection of 0.005 or of 0.01 of the Koch fluid, the disease may be considered to be tuberculous; while the absence of local changes, notwithstanding the possible occurrence of slight fever, excludes tuberculosis.

Of 7 cases of lupus treated, complete recovery took place in but one. In a second, recovery appeared to have taken place, but the cicatrix reopened. In two others there was decided improvement. One case obstinately resisted treatment. The results in 5 cases of tuberculosis of the vertebræ and of the pelvis were not good. In one, a latent osteo-myelitis was stimulated into activity. Four cases of hip-joint disease, without sinuses, improved. To prevent contractures the patients were kept in bed and extension employed. In cases of tuberculosis of the knee-joint, the swelling was usually aggravated, in one case to such a degree as to render incision necessary. The results were more favorable when sinuses existed. The sinuses closed speedily and the joints became relaxed and more mobile. In some instances the cure was facilitated by scraping. In one case, an anal fistule, the result

of tuberculous ulceration of the rectum, was uninfluenced by the injections. In another, of tuberculosis of the epididymis, improvement at first appeared to take place, the enlargement diminishing, subsequently, however, becoming greater than it previously had been. The injections were discontinued because headache and vertigo raised the suspicion of tubercles in the brain or membranes. In cases in which resection had been performed some little time previously, early injections were followed by fever without local reaction. In the case of a boy, however, in whom a coxitis had been cured by resection two years previously, two injections were followed by fever and by redness and swelling at the site of operation. In a case of multiple osteomyelitis, with swelling of one hand, gangrene of the tips of the fingers of the same hand took place. In another case, in which resection of the knee-joint was performed, gangrene of the foot ensued.

Abscess; Glandular Enlargements; Remittent Fever.

Kirchheim (*Deutsche medicinische Wochenschrift*, 1891) presented to the Medical Society of Frankfort the results of his experience with the Koch fluid, and discussed certain questions related to the treatment. In one case, notwithstanding most careful asepsis, an abscess formed at the site of injection. The injections were made in cases in all stages of tuberculosis, except when death was imminent. With a single exception, febrile patients were not subjected to the treatment. In the case with hectic fever, after injections of from 0.003 to 0.005, with decided elevation of temperature, infiltrations of hitherto uninvaded pulmonary tissue, with consonating râles, could be detected, which phenomena disappeared in from twenty-four to forty-eight hours. In almost all other cases increase in weight was noted. This was especially marked in a man seventy years of age, who, during seven weeks, living under unchanged conditions, gained sixteen pounds in weight. In several cases of slight apical involvement, mostly in young persons, small doses early in the treatment, were followed by enlargement of the glands in various parts of the body, especially in the axillary and inguinal regions, occasionally in the submaxillary region. In one case, in spite of withdrawal of the injections, a mild, remittent fever continued for eight days, corresponding to so-called glandular fever. The swellings disappeared in the course of the treatment. In two cases, herpes of the cornea, without injection of the conjunctiva, developed and disappeared without local treatment. Kirchheim believes the reaction following injection a direct result of the action of the fluid, rather than an evidence of absorption of breaking-down tuberculous tissue. By a gradual increase in dosage, tolerance is established—the system accommodates itself to the action of the remedy. If a long interval be permitted to elapse between injections, treatment must be renewed with smaller doses. Even healthy individuals react to large doses. A tendency to cumulative action has not yet been demonstrated. The part which the reactionary fever plays in the curative effect is interesting. Fever is thought to be the means provided by nature for recovery from infectious diseases. Applying the principle to treatment by the Koch fluid, the intervals between injections would be made longer and the doses rapidly increased. Such a course, however, would be too dangerous to be maintained.

In the case of lupus or accessible surgical tuberculosis, the injections may be continued in increasing doses as long as local reaction or improvement takes place. In case of pulmonary tuberculosis, treatment may be withdrawn when the subjective condition has become good, cough and expectoration have almost entirely ceased, bacilli are no longer present in the urine and a dose of 0.05 has been reached. In febrile pulmonary cases, in which, though a dose of 0.05 has been reached, no improvement in the objective condition has taken place and the sputum and presence of bacilli are variable, Kirchheim would rapidly run the dose up to 0.01, until further experience demonstrates the unwisdom of such a course.

Encouraging Result in Lupus of the Nose and Throat.

Krause (*Deutsche medicinische Wochenschrift*, 1891), before the Verein für Innere Medicin, at Berlin, presented a case of lupus of the nose, gums, tongue and hard and soft palate, of four years' standing, in a woman, twenty-two years of age. Previous treatment had been only partially successful. On January 12th, treatment was begun with injections of the Koch fluid, the initial dose being 0.005. The reaction was intense, the affected parts becoming greatly swollen and new ulcers forming. The temperature rose to 104° after each of four subsequent injections. After the sixth, the temperature reached only 99.1°, and subsequently never more than 100.4°. At the end of the fifth week fourteen injections had been given and the dose reached was 0.06. The changes in the diseased areas were characteristic. Infiltrated nodules, however, remained, which may require surgical interference. Twelve pounds in weight were lost in three weeks, of which four pounds had since been regained. The loss of weight was due not only to the fever but also to the difficulty of swallowing in consequence of the great swelling of the parts. The result, while not complete or perfect, was encouraging.

Batch of Good and Bad Results.

Before the Berlin Medical Society, Lassar (*Deutsche med. Wochenschr.*, 1891) presented a girl, thirteen years of age, who, for two years, had had a tuberculous ulcer, as large as the palm of the hand, on the extensor surface of the left thigh, which, in the course of about four weeks, after a number of injections of small quantities of the Koch fluid, cleared up and closed completely.

Flatau presented a case of tuberculosis of the larynx, in which, after the eighteenth injection of 0.06, an eruption of acute miliary and submiliary tubercles developed in the larynx.

Virchow presented the lungs of a man who had received twelve injections in the course of six weeks. At the end of this time there was continuous fever, and death occurred seventeen days subsequently. The lungs presented the picture of "black phthisis." There was extensive carnification, discolored by deposits of coal-dust, the interlobular septa presenting a grayish network. Two-thirds of one lung and somewhat less of the other were involved in the process. Within this tissue what would be called a dissecting pneumonia had developed. Large suppurating fissures had formed, while

the adjacent tissue was transformed into masses almost cheesy. Microscopically, these masses were found to contain tubercle bacilli and to consist principally of amorphous matter. Nowhere could the beginning of a cheesy hepatization be found. The only appearances indicative of such a beginning were found in small areas at the periphery of the lobules, where the alveoli were filled with epithelial cells undergoing fatty metamorphosis. In a second case, which illustrated the transition from simple hepatization to gangrene, thirty injections were given in the course of twelve weeks. Death took place after a large cavity with pleural adhesions had formed. To this was added fresh hepatization in the lower lobe, in which unusually rapid and extensive breaking down of tissue, with the formation of cavities, was going on. In the intestine beyond the ileo-cæcal valve were an extraordinarily large number of ulcers, in the cæcum and ascending colon in part confluent, and all, Virchow expressed his satisfaction in saying, clearing up and in process of healing. A third case presented a combination of syphilis, phthisis and amyloid degeneration. But two injections, of 0.001 and 0.005 respectively, had been given. In addition to extensive florid phthisis, there was an exquisitely healed syphilis of the larynx, with extensive destruction of the margins of the epiglottis and the formation of deep cicatrices; the tonsils were also atrophied. In a child with tuberculous caries of the right hip, no signs of pulmonary disease were at first detected. Resection of the head of the femur was followed by an apparently good result. Subsequently, fifteen injections of the Koch fluid were made in the course of fourteen days. The autopsy disclosed an intense miliary tuberculosis, especially well marked in the medulla of the right femur, in the lungs and in the liver. In the region of the arytenoid cartilages, on either side, were deep perichondritic ulcers, the rest of the larynx being intact.

GRABOWER stated that his experience led him to believe that the development of gray miliary tubercles in places hitherto uninvaded was not a contra-indication for the continuance of the treatment. He presented two cases in which such nodules had appeared in the hitherto healthy larynx. In one, they disappeared in the course of treatment; in the other they were in process of disappearance. Transference of diseased tissue is to be expected in a curative process completed by absorption, but the process ought to exercise the greatest influence upon these new formations, as has been demonstrated in the larynx. The occurrence of new nodules becomes thus not a contra-indication, but an urgent indication for the continuance of the treatment.

JOLLY discussed the psychoses caused by the fever resulting from the injections, and reported three illustrative cases. In one, the injections had been made for two weeks, with considerable febrile reaction and delirium, following which a psychosis, lasting two weeks, developed. This is a so-called "fever-psychosis," of the variety which occurs after the decline of fevers, and known as collapse-delirium or delirium of defervescence, or epicritic or postcritic delirium. Such conditions are occasionally observed after all fevers, *e. g.*, after prolonged fever occurring in the course of tuberculosis. The predisposing cause in the case in question was the mental depression in connection with the disease. The second case was in a feeble-minded individual, who stuttered and was hard of hearing. Relatively mild febrile reaction

induced the psychosis in his case, which took a melancholic-hypochondriac type. The third case illustrated the correspondence of the action of the artificial fever with that of natural fever. The patient had formerly had hysterical attacks. Following an abortion, a rapid phthisis developed. During and following the fever there was delirium, which ceased with the fever. Then, when the injections produced fever the delirium returned. Such conditions do not counter-indicate the treatment, but they admonish caution.

HENOCH expressed himself as disappointed with the results of the treatment. Of twenty children, including only two or three in an advanced stage, but without fever, many became worse; hectic fever developed in those who previously had no fever; the children wasted. Great care was exercised and the smallest doses were used. In a single case, in which the disease was checked and apparent improvement resulted, the condition subsequently became worse than it originally had been. The bad results are probably ascribable to anatomical conditions. In children, tuberculosis, as a rule, has a wider distribution than in adults; the glands, especially the bronchial glands, are rarely uninvolved.

PARACENTESIS OF THE THECA VERTEBRALIS IN TUBERCULAR MENINGITIS FOR THE RELIEF OF FLUID PRESSURE.

DR. W. ESSEX WYNTER (*Lancet*, No. 3531) has performed this operation on four occasions at the Middlesex Hospital, in cases where coma supervened with great rapidity, in the hope of relieving cerebral pressure by draining away cerebro-spinal fluid continuously by the theca vertebralis.

Case I. Boy aged five years. Coma on eighth day. A fine Southey's trocar and canula inserted close to the spine of the second lumbar vertebra, until the point touched the lamina, when it was diverted downward and inward through the ligamentum sub-flavum and theca. Clear fluid welled up at once on withdrawing the trocar, and more than four drachms of fluid escaped during the next twenty-four hours. The Cheyne-Stokes rhythm gave place to regular breathing, the color improved, and the child was enabled to swallow. The improvement was not maintained; the fluid ceased to run, and the case terminated fatally. Post-mortem there was considerable tubercle at the base, with opaque lymph, but no excess of fluid. The prick in the theca was not discoverable, and there was no evidence of damage to the cauda equina.

Case II. Girl aged eleven years. Coma on ninth day. The theca was punctured with a fine knife at the level of the second lumbar spine. Clear fluid escaped with some force, and a small drainage-tube was inserted and an antiseptic dressing applied. Next day the temperature had fallen to normal and the child could be roused. The dressings were saturated with fluid and changed. On the third day the fluid ceased to escape and death occurred next day from coma. After death the aperture in the theca was found to have closed, and when the membrane was incised fluid spurted out in quantity. There was very little meningeal tubercle.

Case III. Boy aged two years and four months. Coma on fourteenth day. Theca opened at level of first lumbar vertebra, when several drachms of fluid escaped, the flow being increased with each inspiration. A drainage-

tube was inserted. On the escape of the fluid the pupils, formerly dilated and inactive, contracted and regained their reflex activity at once. Twelve drachms of clear alkaline fluid were obtained, having a specific gravity of 1004, containing a large quantity of chlorides, but giving no reaction to tests for albumin and sugar. The child died five hours after the operation.

Case IV. Girl aged thirteen months. Ailing fourteen days. Semi-conscious on admission, with irregular breathing, sunken fontanelle, and well-marked *tache cérébrale*. Two days later convulsions occurred. Four ounces of cerebro-spinal fluid were withdrawn by a Southey's tube between two lumbar spines, the last two ounces being blood-stained. Death occurred the same day. The prick in the theca was not visible, but there was slight extravasation of blood on its outer surface. The cauda equina was unhurt. There was extensive general tuberculosis.

Though none of the cases were successful, no harm in any one resulted from interference. To some there was temporary relief of the symptoms, and the necropsy in each case showed ample reason for the fatal termination.

SURGERY.

UNDER THE CHARGE OF

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SPONGES AND THEIR USES IN SURGERY.

After a careful consideration of the methods of preparing sponges in commerce, MAYLAND (*Annals of Surgery*, vol. xiii., No. 5), incited thereto by two cases of septic poisoning occurring in his practice, carefully considers the best methods of rendering sponges absolutely sterile.

He finds that sponges of close texture, even if soaked in a solution of carbolic acid up to the strength of 1 to 40, are not rendered sterile throughout. The central portions of such sponges, if planted upon nutrient gelatin, show abundant growths of putrefactive microbes. Again, the ordinary surgical sponge, impregnated with foul discharges and thoroughly cleansed with a solution of carbolic acid, likewise exhibits, when implanted upon nutrient gelatin, abundant growths. If, however, a solution of 1 to 2000 bichloride of mercury is employed, such sponges remain entirely sterile. He considers the small cut Turkey sponges the best, because, though their texture is close, their shape prevents them from being anywhere so thick as to prevent the thorough penetration of the antiseptic solutions.

The question of the proper manner to store sponges is one of extreme importance. A number of sponges were kept for nine months, some in a solution of 1 to 20 carbolic, others in a solution of 1 to 500 bichloride. Both sets were darkened, but neither suffered in consistence, and even by microscopical examination no changes in texture could be detected. The sponges will in time darken, not from being actually dirty, but from the process of pigmentation. It would seem, then, that after the sponges have been thoroughly cleansed, storing in 1 to 500 bichloride solution renders them absolutely sterile and does not impair their useful qualities.

The author has usually employed the hyposulphite process in preparing sponges; that is, the sponges are first steeped in a hydrochloric acid solution, 1 to 10, then immersed in a bath composed of hyposulphite of soda one part, hydrochloric acid two parts, water twelve parts. This solution is then pressed out, and the sponges are well washed in cold water. They are finally placed in a bath containing half an ounce of carbonate of potash.

Objection is raised to using the sponges more than once, since while it is quite possible to render a septic sponge aseptic, there is no means of knowing whether or not ptomaines or toxic albumoses may be present, and there is no known agent which can be relied on to counteract the possible toxic effect of such substances.

Resection of the Appendix Vermiformis during the Quiescent Stage of Chronic Relapsing Appendicitis.

Weir (*Annals of Surgery*, vol. xiii., No. 5), after a careful study of the reported cases of operation upon the appendix vermiformis during the intervals of attack, sums up his ideas upon the subject as follows:

1. That the final outcome of the review of these cases has been that the large majority of recurrent attacks are due to catarrhal appendicitis, which, though to an unknown degree capable of producing explosive and serious peritoneal inflammation, yet generally, from the lumen of the tube being previously shut off from the cæcum, limits correspondingly the chances of fecal or severe infection of the peritoneum.

2. That the simple catarrhal appendicitis can be suspected when the recurrences are frequent—that is to say, more than four or five times, as in the acute processes this is seldom exceeded—and when such attacks are not of a severe type, nor of greater duration than a week, and particularly so if there be no appearance of a distinct tumor.

3. In such cases delay in operating may be encouraged to a reasonable extent, at least until it is indubitably proven that the invalidism is a confirmed one. Out of five cases seen by Weir in the last year for recurrent attacks of appendicitis, in three, of the above-described simple form, it was advised to wait till the next acute attack presented itself as a further justification of surgical interference; but this did not occur in any of these. In the two others, from the persistent invalidism or the severity of some of the attacks, an operation was advised.

4. Where a tumor is present in the quiescent stage, or has been decidedly felt after the acuteness of the attack has passed off, more urgency is present, as it indicates, it is believed, either an accumulation of noxious contents or

of ulceration within the appendix, or an already present small perforation. It is in such cases that Mackenzie says that we can expect, if an acute process is subsequently set up, that it will be a circumscribed rather than a general suppurative peritonitis. The frequent conjunction, in the collected cases, of adhesions with the severer forms of the catarrhal appendicitis with retained secretions or with minute perforations, seems to corroborate this view.

5. That as the diagnosis of the separate condition of simple catarrhal appendicitis and its complications of distention from retained fluids and of ulceration, are not at present to be differentially diagnosticated, and as it has been shown that each case can give rise to dangerous conditions, recurrences of severity and frequency should hereafter mean that an exploratory laparotomy should be resorted to, on the general principle of this being of less risk than the disease itself.

The Treatment of Hydatid Disease by Incision and Evacuation of the Cyst Without Drainage.

Bond (*British Medical Journal*, No. 1580), while conceding that all hydatid cysts in which suppuration has taken place should be treated by incision and drainage, believes that for cysts which are still living and growing, and which contain clear fluid with or without daughter cysts, incision and evacuation of the cyst contents without any subsequent drainage, or with only temporary drainage for a few hours after the operation, is a procedure which deserves prominence in the minds of surgeons. He reports a case in point. There was a large cyst situated between the bladder and rectum beneath the peritoneum; this had grown upward, filling the pelvis and blocking the bladder and the urethra. The bladder was dragged up till its fundus reached to within two inches of the umbilicus.

The cyst was at first aspirated. Three weeks later it was treated by incision. The elastic cyst proper had separated from the outer cyst wall and lay loose in the cavity, together with much pus and several smaller daughter cysts. The elastic membrane and contents were removed entirely. The cavity was sponged out and a large drainage-tube was inserted. On exploring the general peritoneal cavity, a small cyst about the size of an orange was found in the reflection of the peritoneum in the right iliac fossa. This was incised, and the elastic membrane and clear fluid were removed. The remains of the cyst were then returned into the peritoneal cavity. At a subsequent operation no trace of this cyst could be found. A third large cyst was noticed in the epigastric region, but was left for subsequent treatment.

Five months later, on examination, the cyst in the epigastrium was the size of a fœtal head, and there was another cyst in the lower part and to the left of the abdominal cavity. The abdomen was opened by median incision, passing through the umbilicus, and three cysts were discovered; these were incised. As a result of this the white elastic cyst proper shrunk somewhat away from the walls or ectocyst, and lay, together with daughter cysts, in the cavity. It was easily withdrawn with ring forceps, although, from its brittleness, in several pieces. One omental cyst was removed entire, after tapping,

by ligaturing that portion of the omentum to which it grew. The two cysts treated by removal of the walls were drained for sixteen hours.

As a result of experience in these cases, Bond concludes that when there is difficulty in bringing the cyst wall to the surface of the body, provided due care be taken to evacuate the cavity of all the fluid and elastic contents, the inverted edges of the incision into the cyst may be sutured, and the whole may be returned into the abdominal cavity. Hemorrhage will probably not occur unless it is occasioned by interference with the outer wall or ectocyst. Sutures should be applied to the inverted opening to prevent the entrance of a coil of intestine. Cysts of the liver and other organs are apparently amenable to the same treatment. The elastic lining shrinks on withdrawing the fluid, and can be drawn out by means of gentle traction with forceps. Even in suppurating cysts in which drainage is necessary, it is important to remove the solid contents at the time of incision.

The Operative Treatment of Rectal Cancer.

In a brief but very excellent *résumé* of this subject, Thorndike (*Boston Medical and Surgical Journal*, vol. cxxiv., No 19) reviews the methods of operation for malignant disease of the rectum. From the study of a large number of statistics he finds that excision of the rectum from below gives a mortality of about 15 per cent., and that about 10 per cent. of the cases which survive the operation are permanently cured. Only those cases in which the examining finger in the rectum easily reaches the upper limit of the disease are subject to operation from below.

Kraske, by approaching the seat of disease from behind, instead of from below, has greatly extended the possibilities of complete extirpation of cancerous disease, even when the bowel is involved high up. By enucleation of the coccyx and the removal of a small portion of the lower part of the sacrum, he secures a large opening which affords ample opportunity to view the rectum and to work upon it. If the anal portion of the bowel is involved, and the disease is not very extensive, a resection is readily performed. The two ends of the bowel may then be brought together in front, the posterior opening being left to be closed by secondary operation. Or the following plan, devised by Hochenegg, may be adopted: The upper segment of the bowel may be telescoped through the lower, and may be held in this position by a double row of sutures, one row above the anus and the second row about the margin of the anus. If the anal portion of the gut has been removed, an artificial anus must be formed. In this case the bowel involved is brought out through the sacral opening, the wound being allowed to heal with a drainage-tube packed into it. The sacral anus is provided with a pad made by Leiter, which does its work so thoroughly that patients are exceedingly comfortable while wearing it.

Ligation of the Saphena Magna for Varicose Veins of the Lower Extremity.

Trendelenburg (*Beitr. zur klin. Chir.*, Bd. vii., Heft 1, and *Rundschau*, 32 Jahr., Heft 5) recommends as an exceedingly efficient treatment in certain

cases of varicose dilatation of the veins of the leg, where this dilatation affects not only the branches of the vein but the main trunk also, ligature of the saphena magna. Before operating the surgeon must assure himself that the dilated trunk is the only one which carries the blood from the parts below, since very frequently there are two principal branches of the saphena, which, if both are so widely dilated that the valves are incompetent, must both be tied before any amelioration can be expected. The best place to perform this ligation is about the middle of the thigh. An incision an inch long is made in this region; the vein is exposed, a double ligature is applied, and the vessel is divided between. As a result, the blood is carried from the superficial portions of the limb by the deep communicating veins. The improvement is immediate and permanent. Long lasting varicose ulcers heal quickly after this operation. Frequently the varices do not entirely disappear, but the condition is always greatly improved. Of course, this method of operating requires the most careful application of antisepsis.

Extirpation of the Larynx.

Tauber (*Archiv f. klin. Chir.*, Bd. xli., Heft 3) has tabulated 163 cases of extirpation of the larynx, and has analyzed his tables with typical German minuteness. As a general result he finds that the operation is followed by death in 69.9 per cent. of all cases. Permanent cure—that is, failure of the disease to return for three years after operation—is noted in 7.9 per cent. of the cured cases. It is a well-known fact that in Spencer Wells's hands ovariotomy gave a mortality of 70 per cent., and that by improvement in technique this mortality has fallen to less than 4 per cent. There is little hope held out by Tauber that a similar improvement in the results of laryngectomy may be expected, since the percentage of death is the same now as it was ten years ago.

It would seem from this study that laryngectomy is an operation which should not be performed, since even when from mechanical interference a tumor of the larynx threatens to produce a fatal result, tracheotomy will afford immediate relief, and there is about as much assurance against recidivity as is afforded by complete extirpation of the larynx, at least in such cases as are far advanced.

Bardenheuer (*Ibid.*) takes quite an opposite view of this operation. He believes that he has so improved the technique that the mortality will be greatly lowered, and instances, in proof of this fact, that while his first four patients died immediately following the operation, the last four, treated by a different method, all recovered. He found that the patients died not immediately after the removal of the tumor, but in from eight to four days, and that the mortality was due to septic inflammation, usually beginning in the deepest portion of the wound, in the space between the trachea and the surrounding muscular tissues. From this position inflammation extended along the loose cellular tissue of the neck into the mediastinum, and death usually resulted from septicæmia and pneumonia. The cause of infection was usually penetration of the liquid food and of the secretions of the mouth into the deeper portions of the wound. Bardenheuer modified his laryngectomies by attempting to sterilize the mouth for several days before operation.

The teeth were subjected to repeated frictions with antiseptic solutions, and the mucous membrane was dried with salicylic cotton. His next modification consisted in so placing the patient after operation that secretions of the mouth could not drain into the wound. The mattress was so arranged that the head was extended backward, and the pharynx was on a lower level than the cavity made by extirpating the diseased trachea; hence fluids gravitated to the mouth, and not away from it. His final modification consisted in carefully respecting the anterior wall of the œsophagus and the mucous membrane of the trachea immediately below the epiglottis, so far as it was healthy. After removal of all the diseased portions, the anterior wall of the œsophagus was brought forward and stitched to the mucous membrane of the trachea, thus forming a septum between the mouth and the wound cavity. Further, the free edge of the epiglottis was freshened and stitched back to the anterior wall of the œsophagus. The cavity of the wound was then firmly packed with sterilized gauze, and the dressing was changed in from two to eight days, depending upon the length of time the stitches held. Frequently the patient was able to swallow, thus relieving the operator of the necessity of passing an œsophageal tube. The sutures shutting the mouth from the wound cavity need not be left longer than fourteen days, since this is a sufficient time to allow of protective granulations being formed.

Palliative Operations in Cases of Enlarged Prostate.

Vignard (*Annal des Malad. des Org. Génito-urin.*, vol. x., 1891; *Centralbl. f. Chir.*, No. 10, 1891) believes that in the very great majority of cases of hypertrophy of the prostate, bloodless therapeutic measures are sufficient. He would recommend surgical intervention—that is, puncture of the bladder or supra-pubic cystotomy, or the boutonnière operation—only in cases of retention where catheterization is impossible, and where septic urine absolutely requires evacuation; in cases where great difficulty in passing the catheter is not relieved by permanent catheterization; and in cases of cystitis not relieved by careful and long-continued medication. In the first two instances the boutonnière operation is indicated, whilst where cystitis is present supra-pubic cystotomy should be practised.

OBSTETRICS.

UNDER THE CHARGE OF

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The Relation of the Weight of the Placenta to the Weight of the Child.

J. H. Smith, Assistant in the Frauen-klinic, Munich, took the opportunity of searching the records of five hundred births to obtain statistics regarding

the relative weight of the child and the placenta: the results have been incorporated in a series of elaborate tables, from which he draws the following conclusions:

The placenta being completed at the sixteenth week, a study of its relative size may begin appropriately at the seventeenth week. In the cases observed, the average weight of the placenta to that of the child was one-third from the seventeenth to the thirty-second week. Between the thirty-second and thirty-third week the placenta attained its acme of weight, and remained stationary at this point unless influenced by derangements of the fœtal circulation, until birth at the fortieth week. Thus, during the thirty-third and thirty-fourth week the ratio remains one-third; during the thirty-fifth, thirty-sixth, and thirty-seventh weeks, it is one-fourth; in the thirty-eighth and thirty-ninth, one-fifth; and at the end of the thirty-ninth, two-ninths. From the end of the thirty-ninth week until birth, whether labor occurs at the fortieth week or is delayed until the forty-fourth, the ratio remains one-fifth. After the fortieth week, the placenta seems to grow rapidly in multiparæ, or with women having large children, thereby raising the average from one-fifth to one-fourth.

A Case of Retro-peritoneal Pregnancy.

Jaggard (*American Journal of Obstetrics*, April, 1891) describes a case of retro-peritoneal pregnancy in the seventh month as follows: The pregnancy was the first, the patient suffering during the entire time from pain and weakness. The size and shape of the abdomen were suggestive of twin pregnancy; the uterus did not exhibit the usual signs of pregnancy, and the woman's condition was so serious as to render operation impossible. Transfusion of twenty ounces of salt solution was performed, and it was determined to wait, hoping for an increase in the strength of the patient; she became able to leave her bed and seemed to be gaining; on the ninth day symptoms of septic infection manifested themselves and the tumor became emphysematous. It was determined to dilate the cervix and version was performed, with the extraction of a macerated fœtus. The placenta was half adherent and half detached; death followed soon after the operation. A post-mortem examination was immediately made; it was then discovered that the pregnancy originally developed in the right broad ligament, the ovum passed up into the abdomen behind the peritoneum. Death of the fœtus, with placental hemorrhage, was caused by exertion. The dilator employed to dilate the cervix had ruptured the posterior wall of the lower uterine segment and opened into the fœtal sac.

Intra- and Extra-uterine Pregnancy occurring Coincidently in the Same Patient.

The unusual coincidence of normal and ectopic pregnancy is illustrated in a case reported by Worrall, in the *Medical Press*, page 296, 1891. The patient was a multipara who was awakened at night by severe abdominal pain, followed by slight hemorrhage; she recovered her health, the abdomen enlarged, and she was told that she was pregnant; the tumor gradually decreased in size and menstruation returned; when examined, the abdominal tumor was

found composed of two parts, one the uterus with a living fœtus, the other, probably, an ectopic fœtus. Upon laparotomy, a dead fœtus was found in the abdomen, which had developed in the posterior layer of the broad ligament; it was removed and the sac stitched to the abdominal incision. The next day labor came on and the intra-uterine fœtus was delivered; the patient recovered, the sac being drained and irrigated by an antiseptic fluid. The case is of an especial interest, as one in which intra- and extra-uterine pregnancy occurred concurrently.

The Treatment of Premature Detachment of the Normally Situated Placenta.

Four cases of this abnormality are reported by Meyer (*Correspondenzblatt für Schweizer Aerzte*, No. 7, 1891). His experience leads him to believe that these cases are best treated by avoiding the rupture of the membranes, thereby maintaining the tension of the uterine muscle and preventing bleeding, while the physician should watch his patient until dilatation is so far advanced that speedy labor is possible. These cases demand close attention. When the mouth of the uterus is as large as a dollar, and the cervix is obliterated, the membranes may be ruptured if the condition of the patient justifies it; active measures may be taken to terminate labor after delivery. Special precaution should be taken to empty the uterus of all its contents, and to bring about firm uterine contraction.

Pernicious Vomiting and Ptyalism of Pregnancy as Hystero-neuroses.

Ahlfeld advances the theory, in the *Centralblatt für Gynäkologie*, No. 17, 1891, that pernicious vomiting and ptyalism of pregnancy are hystero-neuroses of reflex nature. He has treated such cases successfully by measures adapted for the cure of neuroses, removing all possible irritants from the patient, and using sedatives addressed to the nervous system.

Fetor of the Lochial Discharges.

Boxall (*Practitioner*, No. 5, 1891) has conducted researches upon 640 patients to determine the relationship existing between fetor in the lochial discharges and septic infection; six deaths occurred from sepsis among these patients; he concludes, from his observations, that septic infection may take place without fetor and that fetor also may occur without sepsis or fever. Fetor is most frequent in cases where the tissues are bruised and torn, and, therefore, in primiparæ and operation cases.

It is generally but not invariably associated with fever, but in such cases the fever almost always precedes the fetor by a considerable interval. While the presence or absence of fetor is a very uncertain guide to the presence or absence of sepsis, still it indicates the failure to maintain local asepsis, and vigorous antiseptic measures should be at once instituted. The vulva and vagina should first be cleansed and the uterus not be entered unless it is absolutely necessary.

Five Hundred Labors without Internal Disinfection.

Mermann completes his account of a series of 500 labors without an internal disinfection, in the *Centralblatt für Gynäkologie*, No. 20, 1891. In the 500 cases there occurred no death from sepsis or its complications. In the last 200 cases a vaginal douche was given once, in a case of placenta prævia which had been tamponed before admission to the hospital. The complications of pregnancy and labor are all fairly represented in the series, and with surprisingly good results. The only precaution taken against ophthalmia was irrigating the eyes with distilled water; but one case, and that a mild one, occurred.

Mermann employs scrupulous cleanliness and antisepsis externally but none internally, and limits vaginal examinations to the least possible number.

Hemorrhage from the Membranes During Labor.

Ballantyne (*Edinburgh Medical Journal*, No. 581, p. 1006, 1891) reports the case of a primipara who had uterine hemorrhage during the first stage of labor; examination failed to reveal any cause for the hemorrhage; labor proceeding, slight hemorrhage occurred and the patient was delivered spontaneously of a small and feebly developed fœtus. A slight amount of hemorrhage followed the birth of the child, but no unusual bleeding occurred after the delivery of the placenta; the child perished of heart failure soon after birth. During the lying-in state slight fever occurred on the second and third day, with an attack of urticaria and painful swelling of the breasts.

When the placenta and membranes were examined the placenta showed a small apoplexy with areas of fibroid thickening; around the aperture where the membranes ruptured there was a vascular zone varying in breadth from three-quarters of an inch to two inches; the bloodvessels of this zone were situated either in the chorion or in the shreds of the decidua attached to its surface. Two primitive villi were found in this zone; an intra-mural fibroid was found in the lower segment of the uterus, which may have favored the hemorrhage by maintaining a vascular condition of the parts.

The Emotional Element in the Puerperal Period.

Wright (*Journal of Nervous and Mental Diseases*, No. 5, 1891) reports seven cases of emotional disturbance occurring in the puerperal state accompanied by fever without septic infection. On analyzing the cases it was found that some sudden fright or fit of passion had caused the symptoms, which promptly disappeared when the cause was removed.

Induced Labor.

In *La Médecine Moderne*, Nos. 15 and 16, 1891, Pinard, in writing upon induced labor, states that the birth of a living child in deformed pelves cannot be expected except in cases where the pregnancy is advanced at least seven months and the antero-posterior diameter of the pelvis measures 3½ inches at least. Pinard states, as a rule, that where the antero-posterior diameter measures 8½ cm. he would induce labor at eight and a half months, with 8

cm. at eight months, with 7½ cm. at seven and a half months, and with 7 cm. at seven months.

He has found the balloon dilator employed extensively by Tarnier most useful. He endeavors in induced labor to secure, if possible, a vertex presentation and a spontaneous labor, and where these conditions were present he lost no mothers and but one child in twenty-four cases. In cases where delivery was accompanied by forceps, breech extraction or version, nearly one-half of the children perished.

Curetting the Puerperal Uterus.

The subject of the advisability of the use of the curette after labor at term was discussed in a recent meeting of the Obstetrical Society of Berlin (*Centralblatt für Gynäkologie*, No. 18, 1891). Fritsch had given the method of treatment by curetting a fair trial, but was convinced of the danger and injury accompanying the practice. He believed that recovery in cases of puerperal sepsis depended largely upon the encapsulation of the focus of infection, and this was prevented by the interference of the curette. The advocates of curetting consider it indicated in sapræmic cases, but the diagnosis of sapræmia is often impossible during the life of the patient.

Olshausen did not favor curetting the puerperal uterus on account of the danger of rupturing the uterus, which is greatly thinned after labor.

He considered the danger of accidents when the puerperal uterus is curetted with a sharp curette to be very great.

He also believed that in most cases septic infection gains entrance to the uterus through lesions in the cervix. Portions of the endometrium become involved at a time, rarely the whole. It is impossible with the curette to select the affected portion, and hence more harm than benefit may result from curetting.

Veit narrated his observations with four cases where he had seen injury and a bad result follow curetting. He considered the proposition to treat the uterus in puerperal sepsis like an abscess cavity a distinct step backward, not an advance.

After the period of incubation there is in puerperal sepsis an indifferent stage in which exact diagnosis as to the degree and probable severity of the infection is difficult; during this stage the sharp curette is the most inappropriate of instruments, antiseptic injections being much more suitable and efficient.

Gottschalk discussed the question from the standpoint of bacteriology, remarking that Braun, who introduced the curette in obstetric practice, advised its use in sapræmia and not in septicæmia and pyæmia.

He recognized the difficulty of making a differential diagnosis in a given case between these conditions, and, furthermore, when such a diagnosis is made, the abrasion of tissue produced by the curette was extremely injurious. In the unmolested uterus the conditions are not favorable for septic absorption; saprophytic products are not injurious to living cells, and are safely removed by the lochia. At the placental site but little mucous membrane is left to harbor bacteria.

Curetting removes thrombi from sinuses and favors the absorption of con-

centrated solutions of ptomaines, which are highly poisonous. Most rational and safe is the treatment of this condition by irrigating the uterus with sterilized water at 104° F. The heat stimulates the uterus to contract and expel poisonous materials, while the water dilutes the ptomaine solutions until they are innocuous.

GYNECOLOGY.

UNDER THE CHARGE OF
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The Action of Antiseptics upon the Peritoneum.

Delbet, Grandmaison, and Bresset (*Annales de Gynécologie et d'Obstétrique*, 1891) as a result of their united experiments and observations, arrive at the following conclusions:

1. The strong antiseptics, such as carbolic and salicylic acids, corrosive sublimate and biniodide of mercury, present more disadvantages than advantages, since they irritate a healthy peritoneum and thus favor the formation of adhesions.

2. The most useful solutions to be employed in laparotomy are one of sodium chloride (six or seven parts to one thousand), and of boric acid (three parts to one hundred).

3. Iodoform and salol exert but little action upon the peritoneum, and it is a question if they have any antiseptic effect.

Uretero-vaginal Fistula.

Althen (Inaugural-dissertation, Munich, 1889; abstract in *Centralblatt für Gynäkologie*, 1890) analyzes thirty-five cases, the histories of three of which were recorded at Winckel's clinic, and finds that in the majority the condition could be traced to a previous severe instrumental delivery or operation, especially vaginal hysterectomy and the opening of pelvic abscesses. Ureteral fistulæ are to be distinguished etiologically as congenital, traumatic, and spontaneous. In twenty cases an operation was performed, only ten of which were successful.

Torsion of the Pedicle in Ovarian Cysts.

Küstner (*Centralblatt für Gynäkologie*, 1891) has made a number of observations bearing on this interesting subject, and differs from other authors in his explanation of the etiology. In his last thirty-six ovariotomies he found in fourteen cases (38.8 per cent.) torsion of the pedicle up to at least 180°. Rokitansky records 13 per cent., Thornton 9.5 per cent., Olshausen 6.3 per cent., and Horwitz 23.2 per cent. He explains the greater frequency of this complication in the Dorpat clinic by the fact that in most

of the cases inflammatory adhesions existed. In the majority of the cysts of the right ovary the torsion was toward the *left*, in those of the left ovary toward the *right*. His explanation is as follows: As soon as the tumor rises out of the pelvis and comes in contact with the abdominal wall it tends to fall forward, displacing the uterus backward. The ovarian ligament is now put on the stretch and crosses the tube, so that when the tumor lies in contact with the abdominal wall there is really a torsion of its pedicle to the extent of 90°, which is usually overlooked at the time of operation. If the pedicle is small, and the abdominal wall relaxed, changes in the centre of gravity of the tumor are readily produced by changes in the position of the patient; when she lies upon her left side it tends to rotate from right to left, since the infundibulo-pelvic ligament (which is its principal attachment) extends from the posterior wall of the pelvis anteriorly from right to left. The reverse is the case when she lies on her right side. This torsion is probably only temporary. After the neoplasm occupies the abdominal cavity the pressure of the intestines upon its posterior surface during peristalsis tends to increase the existing torsion; this pressure on the right side is exerted most upon the left side of the tumor and *vice versâ*. This theory was supported by a case of double ovariotomy of the writer's, in which the pedicle of the left tumor was twisted 180° to the right, and that of the right to the left.

The Treatment of Uterine Fibroids According to Apostoli's Method.

Two recent communications by well-known and successful abdominal surgeons are of considerable interest from the different conclusions at which the writers arrive.

Keith (reprint from *British Medical Journal*) reports further progress in the electrical treatment of fibro-myomata. During the last three years and a half he has operated only upon fibro-cystic tumors, and believes that with care there ought never to be any doubt regarding the selection of proper cases. The best results are obtained in the case of small bleeding tumors of recent origin, which require shorter treatment than the old, large ones. He summarizes as follows: "This treatment *almost always* relieves pain. It *almost always* brings about diminution of the tumor—sometimes rapidly. It *almost always* stops hemorrhage—sometimes rapidly. The results are *almost always* permanent, and the growth of the tumor, if it be not lessened, is stopped. The general health is immensely improved. By '*almost always*,' I mean nineteen cases out of every twenty."

Homans (*Boston Medical and Surgical Journal*, 1891) records the results of his experience with the electrical treatment of uterine fibroids since December, 1887, including thirty-four cases, the subsequent histories of which were carefully traced. Of these the principal results noted were relief of pain and hemorrhage, and improvement in the general health. In ten cases the tumor continued to grow, in sixteen no change was noted, and in only two was there a marked diminution in its size; in the latter the menopause appeared soon after the cessation of the treatment. In general, he regards the treatment as merely symptomatic and rather unsatis-

factory. It is not entirely devoid of danger, and is not capable of successful application by the general practitioner. "It may be inferred," he adds, after citing fourteen successful laparo-hysterectomies out of fifteen cases, "that I have found nothing sufficiently curative in electrolysis to make me lay down my knife and never take it up."

Intestinal Obstruction After Ovariotomy.

Anderson and Handfield Jones (*Lancet*, 1890) report a case in which obstruction occurred seventeen days after operation. The abdomen was reopened three days later and a strong adhesion was found, attaching a coil of small intestine to the anterior abdominal wall. It was separated, the collapsed coil dilated, and the obstruction was overcome. The patient continued for a short time to have fecal vomiting, but eventually recovered. The writers distinguish two forms of obstruction following abdominal section, the first being almost immediate, the second developing after convalescence. In the first the symptoms are masked by those of peritonitis, and a secondary operation is usually fatal; in the second the diagnosis is easier and an operation promises relief. A second case is reported in which the obstruction was relieved twenty-five days after the primary operation.

Collas (Thèse de Paris, 1891) has collected twenty-three cases, eighteen of which followed ovariotomy. In eight cases a secondary operation was performed, four being successful. In fifteen the actual condition was only revealed at the autopsy. The symptoms of obstruction usually developed within ten days after operation, but in one instance six years elapsed. Peritonitic adhesions were the usual factors. The symptoms appeared suddenly and were not relieved by palliative treatment. The writer's deduction is that laparotomy offers the only positive means of relief.

The Treatment of Osteomalacia by Castration.

Hofmeier (*Centralblatt für Gynäkologie*, No. 12, 1891) reports the case of a virgin, aged thirty years, who had osteomalacia of three years' standing, the disease being progressive at the time of operation, as shown by the presence of severe pains in the pelvic bones, inability to walk, and marked pelvic deformity. Menstruation regular and painless. Four weeks after removal of the ovaries the patient could walk without assistance, and the pains were much less severe. She received cod-liver oil and peptonate of iron; six weeks later she felt quite well, had no pain, and could walk a long distance. The pelvic organs were normal. The ovaries were atrophied, as in a woman after the menopause, and presented a similar appearance microscopically, only a few ovisacs being seen. The case was interesting, not only because the patient was a virgin (hence pregnancy could not be regarded as an etiological factor), and there was no disturbance of menstruation, or evidence of pelvic congestion.

As regards the effects of castration under such circumstances the writer admits, with Fehling, that it is impossible to give a satisfactory explanation. It may be due to some reflex action upon the vasomotor nerves supplying the nutrient vessels of the pelvic bones, the disease itself being regarded as a tropho-neurosis of the bones directly dependent upon ovarian activity. This

theory receives additional support from a similar case reported by Truzzi. Fehling has collected twenty other cases of castration for osteomalacia, in none of which was there a failure on the part of the operator to secure at least a temporary benefit.

Paralysis Following Subcutaneous Injections of Ether.

Eberhart (*Centralblatt für Gynäkologie*, No. 12, 1891) reports the following interesting case, which is of considerable interest to laparotomists, since ether is frequently used hypodermatically as a cardiac stimulant in cases of collapse during abdominal section.

In the course of an operation upon the cervix and perineum Eberhart's patient suddenly collapsed, whereupon two injections of ether were given, one on the anterior, and the other on the posterior aspect of the right forearm. The following day the patient had extensor paralysis of the middle, ring, and little fingers of the right hand, which disappeared in six weeks under faradization. It was inferred that a branch of the radial had been affected. Similar cases have been reported by Heymann, Mendel, and Remák; the latter attributes the paralysis to the direct irritation of the peripheral nerve by the ether. [We have long held the opinion that ether, although one of the most rapidly-acting cardiac stimulants, is too irritating for hypodermic use, even in emergencies in which it is invariably so employed. Even if paralysis does not result, persistent localized pain, paræsthesia, dermatitis, and abscesses are not infrequent results. We have found that deep injections of camphorated oil (one part to four), as recommended by the writer, were equally efficacious, and much less irritating.—Ed.].

Cystopexy.

Tuffier (*Centralblatt für Gynäkologie*, No. 15, 1891) reported at the Société de Chirurgie several cases of cystocele treated by cystopexy, the technique of the operation being as follows: The bladder was first dilated with five ounces of boric acid solution, an incision two and one-half inches long was made in the hypogastrium, and a couple of catgut sutures were passed through the edges of the wound and through the superficial muscular layer of the anterior wall of the bladder. The abdominal incision was closed in the usual manner, and the patient was catheterized during the first week. In another case the bladder was suspended by four silk sutures, which included the serosa only, and were not passed through the skin.

Tuffier had operated thrice successfully by the extra-peritoneal method (as in epicystotomy), in one instance performing hysterorrhaphy, cystopexy, and anterior colporrhaphy upon the same patient. [This operation impresses us as being rather heroic treatment for a minor ailment. In the discussion of the paper Verneuil, Pozzi, and Richelot took the same ground. The same procedure was suggested and carried out by Dr. Henry Byford, of Chicago, at least two years ago.—Ed.].

The Relation of Heart Lesions to Pelvic Disease.

Nevius (*Centralblatt für Gynäkologie*, No. 15, 1891) calls attention to the frequent coincidence of cardiac and pelvic disease, mitral stenosis being

most frequently observed. Since the pelvic symptoms usually absorb most attention, the cardiac complication is often overlooked. Among 419 women who were examined, 110 (26 per cent.) had mitral disease; of these, 55 per cent. had erosions of the cervix, 43 per cent. prolapse of the ovaries, 38 per cent. displacements of the uterus, and 43 per cent. menorrhagia or metrorrhagia. [We are forced to believe that the writer exaggerates the frequency of heart lesions in women with pelvic troubles, and would offer in support of this criticism the fact that in institutions like the New York State Woman's Hospital, in which the condition of the heart is carefully noted before operations, no such proportion has been observed. If this fact were well established, the number of gynecological operations, both in private and hospital practice, would be diminished at least one-half.—ED.].

VESICAL PAIN AS A SYMPTOM OF PYONEPHROSIS.

GUYON (*Centralblatt für Gynäkologie*, No. 15, 1891) reports two cases bearing upon this question. In one the extreme tenderness of the bladder in making pressure over the fundus, and in introducing a sound, the amount of vesical tenesmus, and the purulent character of the urine, seemed to justify the inference that the condition was primarily cystitis. Cystotomy was performed, and the pain was promptly relieved. The kidneys, which had previously been so large that they could be palpated, and were quite sensitive to pressure, rapidly diminished in size.

In the second case, in which the presence of enlarged kidneys, fever, and pyuria pointed to an existing pyonephrosis, cystotomy was followed by a disappearance of the symptoms, although the kidneys still remained large. The writer's deduction is that, as renal affections may be secondary to vesical inflammation, so the former may be relieved by treating the latter. [The writer's conclusions would be more valuable if his premises were more trustworthy. It is not clear that he possessed sufficient evidence upon which to base a reliable diagnosis of pyonephrosis. It would seem as if the disease in both instances was situated *below* the kidneys. Under similar conditions we recently made an explorative lumbar incision, and punctured the supposed pyonephrotic kidney, but found no pus. Subsequent observations showed that the symptoms were due to metritis. The recommendation to make an artificial vesico-vaginal fistula is none the less a good one in a doubtful case. —ED.].

EXTIRPATIO UTERI SACRALIS.

Under this term CZERNY (*Centralblatt für Gynäkologie*, No. 16, 1891) describes the operation of removing the uterus after resecting the sacrum, as practised by him in three cases. His technique is as follows: The patient being on the left side, an incision is made along either side of the sacrum. The coccyx, fifth sacral vertebra, and a portion of the fourth, are removed, osteoplastic resection not being recommended, since it retards the healing process. The peritoneum is divided, the coccyx is drawn downward, and the broad ligaments are ligated. The bladder is dissected off from above. The peritoneal wound is finally closed with catgut. The operation consumes at least two hours, and the healing process is slow; its advantages are not great, and it is

only to be preferred in complicated cases—stenosis of the vagina, disease of the parametric tissues, etc.

MÜLLER (*Correspondenzblatt für Schweiz. Aerzte*, Bd. xxi., 1891) has performed the operation with success in three instances. The disadvantages of the operation are the necessary external incision and the preliminary separation of the rectum, and slow convalescence due to the size of the wound. It is sufficient to make an incision from the lower end of the sacrum to a point half an inch from the anus; it is only necessary to remove the coccyx, which will leave a much smaller wound. The advantages of the method are the perfect view of the field of operation, even in complicated cases, the possibility of controlling hemorrhage, and of avoiding injury to the uterus; finally, the peritoneal cavity is more easily and exactly closed. It is particularly applicable to cases of advanced carcinoma.

Unique Case of Foreign Body in the Vagina.

SZIGETHY (*Orvosi Hetilap*, No. 52, 1890) reports the case of a woman, aged seventy-five years, who, thirty years before, in order to support a prolapsed uterus, introduced into the vagina a ball of string previously dipped in wax. This entirely relieved her, and was worn without discomfort, so that she forgot its existence, when it was forced out of place by a violent effort. When extracted, with some difficulty, it measured seven inches in circumference, and was covered with mucus, but otherwise unchanged.

PÆDIATRICS.

UNDER THE CHARGE OF

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Asthma of Children.

R. BLACHE (*L'Union Médicale*, 1890, No. 133) defines asthma as a bulbous disease, in which attacks are produced by impressive irritations of the vagus or peripheral nerves, particularly the trigeminus; the reflex action manifests itself by successive or simultaneous spasms of all the intrinsic inspiratory muscles, intercostals, scalenæ, trapezii, etc., and by a tetaniform contraction of the diaphragm.

Blache thus classifies the disease into three forms: Pneumo-bulbous asthma, essential or nervous asthma, emphysematous or alveolar asthma, catarrhal or bronchitic asthma.

Nervous asthma governs all asthmatical pathology of children. A class of asthma in infantile pathology which holds a place whose importance in-

creases every day as the pathogeny of the affections are better known, is the class of reflex asthmas in general; these are the cases in which the bulbous irritation does not leave the broncho-pulmonary filaments of the pneumogastric. The bulb is then impressed by an excitement springing from all the peripheric branches of the vagus, but again from the other nerves—as the trigeminus and the cutaneous nerves—so that nasal asthma, pharyngeal asthma, amygdaline, gastric asthma, and cutaneous asthma belong to the category of dyspnœas. Nasal asthma has only been known a few years; Voltolini, in 1874, published the first facts relating to mucous polypi determining the approach of transient dyspnœa. Mucous polypi are rare in children; but, on the contrary, adenoid tumors are very frequent and a usual cause of nasal asthma. Hypertrophic rhinitis is also a frequent cause; this may be a primary disease or follow successive attacks of acute coryza, or infectious fevers, as measles and typhoid fever; it may be secondary to another nasal lesion, malformation of the nose, deviating thickness of the partition, foreign bodies, affections of the naso-pharyngeal canal, catarrh, and adenoid growth. More than this, this rhinitis is at times connected with diseases which attack the stomach (Bouchard, Ruault), the intestines (Secchi, Buck), genital apparatus (J. Mackenzie, Joul).

With such a child, predisposed to bulbous irritability, either by diathesis or heredity, and to nasal erectibility following the preceding lesions, an attack of asthma may be brought on by congestion following cold, by the action of vegetable or animal powders, by the influence of odorous matters, by the contact of a probe on the pituitary gland, by an untimely nasal irrigation, and by remote causes, stomachic, intestinal, or genital excitations.

The treatment recommended for the attack is fumigation by belladonna cigarettes, henbane, or the leaves of datura, stramonium, nitre paper, inhalations of oxygen, or ioduret of ethyl, but in many cases the hypodermic exhibition of morphine will be required to produce even momentary relief. In a general way, opium ought to be very prudently used with children; belladonna is much safer and can be used longer. Bretonneau and Guersant mix one centigramme of the extract to one centigramme of the powder of belladonna, giving this each day and continuing for some time. The tincture of lobelia inflata may be given in a dose gradually raised from 20 to 100 drops. Moncorvo remarks that the endurance of children for the treatment permits him to raise the dose 10 and 12 grammes in twenty-four hours. Blache has obtained excellent results from tincture of grindelia robusta, which he gives to children in doses of from 15 to 60 drops. Inhalations of vapor of pyridine, advised by M. Sée, have helped Blache to lessen the force of the attack. According to Laborde and Daudrie, this substance lessens excito-motor force, dilates peripheral vessels, and has a paralyzing action on the vaso-constrictor nerves; hence, it increases the fulness of respiration, at the same time the respiratory movements regulate themselves and diminish in frequency. The curative treatment of asthma limits itself to the almost exclusive use of iodine, particularly the iodide of potassium. The anti-dyspnœic effects of this agent on the brain, and particularly on the bulb, are certain; Binz states that it paralyzes the nervous functions and produces narcotism; in every case it moderates the exciting power of the vital centre and regulates the distribution of the nervous influx.

Asthmatics presenting hyperæmia of the nasal mucous membrane are more easily affected with iodism. In cutaneous asthmas iodine may also be contra-indicated as aggravating the skin condition. At times the emaciation and loss of strength make it necessary to interrupt the treatment. Pyridine by aspiration, tincture of grindelia, arsenic, and aërotherapy by compressed air are, then, the only means which remain at the disposition of the practitioner. The iodine treatment is applicable to non-diathetic asthma; it is contra-indicated when the disease has a telluric or hereditary origin—for example, in the arthritic or gouty—a medication favoring incomplete nutrition or modifying the morbid secretions will be indicated. Asthmatics tainted with paludalism will require quinine in combination with iodide of potassium.

Blache agrees with Simon that the value of certain health resorts cannot be overestimated; the former gives preference to the waters of Mont-Doré, stating that their sedative and decongestive properties have produced good results, particularly in the pneumo-bulbous form; in herpetic asthma children as well as adolescents will find the sulphurous medication good. Bigorre, Saint-Honoré, and Alevard may be recommended.

REMOVAL OF A STONE WEIGHING 365 GRAINS BY VAGINAL CYSTOTOMY, FROM THE BLADDER OF A CHILD SIX YEARS OF AGE; URETER INJURED; OPERATIONS FOR CLOSING THE BLADDER DIFFICULT, BUT ULTIMATELY SUCCESSFUL.

In the *Pittsburgh Medical Review*, 1891, REAMY, of Cincinnati, records a remarkable case, in which, after the removal of a stone weighing 365 grains, *per vaginam*, it was necessary to perform four operations to close the resulting vesico-vaginal fistula, which was half an inch in length. The stone would have been removed by the supra-pubic operation if the operator had realized its size. The urethra was dilated to the size of the little finger; no paralysis followed.

The smallness of the vagina, together with the fact that the child was quite fat, made the operation for closure most difficult; and at the fourth operation the parts were much altered, considerable sloughing had occurred, and incrustation with urine salts; the edges of the wound were everted, ragged, and spongy.

The left ureter was seen to be discharging urine from the wall of the fistula. With much difficulty the ureter was dissected up, the mucous membrane of the bladder cut away sufficiently to uncover it; the free end of the ureter, liberated by the dissection referred to, was not cut off, but turned into the bladder. Seven No. 30 silver wire sutures were introduced into the fistula and allowed to remain two weeks; upon removal union was perfect. Though Parvin, Campbell, and others have turned an exposed ureter into the bladder, this is probably the first case in which this manipulation has been successful in a subject so young.

TWO CASES OF EPILEPTIFORM CONVULSIONS IN EARLY INFANCY.

BISSEL (*Journal Nervous and Mental Disease*, 1891) has observed two cases in very early infancy: the first a boy born of healthy parents, and

the second a boy born of neurasthenic parents, whose mother suffered from nervous prostration and comatose conditions; during the labor her conduct was that of a person suffering from acute mania.

Case I. presented the first symptoms when he was a week old. The convulsions, three in number, were slight and lasted two or three minutes; but they increased in frequency from day to day, so that by the fourteenth day they were 70 in twenty-four hours; on the fifteenth day, 75; on the sixteenth, 79; on the seventeenth, 80; on the eighteenth day the intervals began to lengthen, and there were only 50 on that day, and on the next day but 8 light convulsions occurred; during the next five days they grew continuously less and less and eventually disappeared.

Total number of recorded convulsions, 366. During the entire period the patient took nourishment well, his appearance remained good, and his weight increased nearly two pounds. Medically he received a mixture of subnitrate of bismuth and deodorized tincture of opium, to control a few thin, copious passages from the bowels. To control convulsions, 2 grains of bromide of sodium, increased to 10 grains in twenty-four hours, were given.

Case II. weighed eight and one-half pounds at birth; the greatest circumference of his head was 41 cm.

On the twenty-first day he had four well-marked convulsions; the spasms commenced at first in the hands and feet, with congestion of right hand and face; as the spasm passed the part became pale and the spasms would attack those parts that were reddening; during attacks the respirations were much impeded, there being twenty- and thirty-second pauses in the act; occasionally there would be a minute when the child did not breathe. The total number of convulsions for four days reached the remarkable total of 183. The fontanelles were tense, and measurements showed that the greatest diameter had increased from 41 cm. to 44 cm.; the fontanelles continued moderately tense and the bones widely separated for two days after the convulsions ceased.

The child received oleum ricini and small doses of bromide of sodium, as indicated.

Eighteen months later the boy was fat and well.

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